

FINAL SUPPLEMENT
TO THE
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
PROTOTYPE PROJECT
TO AUGMENT SNOW PACK
BY
CLOUD SEEDING
USING GROUND BASED DISPENSERS
IN
PLUMAS AND SIERRA COUNTIES

OCTOBER 1991

U. S. Department of Agriculture
Forest Service
Plumas National Forest

**FINAL SUPPLEMENT
to the
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IN PLUMAS AND SIERRA COUNTIES**

Plumas National Forest

**State of California
Department of Water Resources**

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FOREWORD

The Department of Water Resources is proposing to conduct a 5-year operational test program for enhancing water yield by augmenting snow pack. This will be accomplished by cloud seeding of winter storms using ground-based dispensers located on mountain tops in the vicinity of the Lakes Basin Area on the Plumas and Tahoe National Forests. A Draft Supplement to the Environmental Impact Statement for the Prototype Project to Augment Snow Pack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties was prepared and circulated for comments. This Final Supplement incorporates comments and responses to comments received about the project. The supplement was prepared in response to specific issues brought forth by the California Sportfishing Protection Alliance and the Friends of Plumas Wilderness in their appeal of the Final Environmental Impact Statement for this project.

Information contained in the Final Supplement supports the findings of the Final Environmental Impact Statement for the project. The prototype cloud seeding project is expected to have no discernable environmental impacts. Changes in the amount, intensity, and duration of snowfall resulting from cloud seeding are expected to be well within the range of variation in natural precipitation. Since the project is designed to operate only in years of average to below average precipitation, the benefits resulting from this project can be significant, and include improved conditions for plants, fisheries, and wildlife.

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PURPOSE AND NEED FOR ACTION

INTRODUCTION

This is the Final Supplement to the Final Environmental Impact Statement completed for a 5-year prototype cloud seeding project proposed by the California Department of Water Resources. The Forest Supervisor's decision to authorize the cloud seeding project was appealed to the Forest Service's Pacific Southwest Regional Forester who affirmed all but six issues raised by the appellants (Appendix A). This document addresses these issues. The appellants were the California Sportfishing Protection Alliance and the Friends of Plumas Wilderness.

The proposed project would seed about 165,000 acres of the Upper Feather River Basin using a network of ground-based, remotely operated propane dispensers (Figure 1). Propane is a freezing agent which vaporizes after being released as a liquid from the dispensers. The dispensers would be placed at elevations where winter-time clouds are at temperatures below freezing. Releases during cold winter storms would create ice crystals which grow to snowflakes. Total increased precipitation for the enhancement area is anticipated to average less than 5%, with increases at higher elevations ranging to 10 percent. Precipitation would primarily be in the form of snowfall. The expected increase in snowpack is well within the normal range of variation for precipitation for the area. Total augmented precipitation is expected to add about 32,000 acre-feet to the project watershed during an ideal cloud seeding season of near average, normal precipitation.

NATURE AND PURPOSE OF THE ACTION

The objective of the Final Supplement to the Final EIS is to address the issues not affirmed by the Regional Forester. Analyses of these issues supports the findings of the Final EIS issued in September of 1990 for this project. Issues not affirmed by the Regional Forester and discussed in the supplement are:

1. The EIS did not adequately describe the existing known data that can relate to the watershed condition and fisheries habitat of the third order streams mentioned in the California Sportfishing Protection Alliance and the Friends of Plumas Wilderness appeal.
2. There was not an adequate description of the cumulative effects and the factors used in the cumulative watershed effects analysis on the third order drainages mentioned in the appeal.
3. The effects of the project on sensitive, threatened and endangered wildlife species need to be better addressed.
4. A further analysis needs to be made on the potential effects of flooding on small streams.

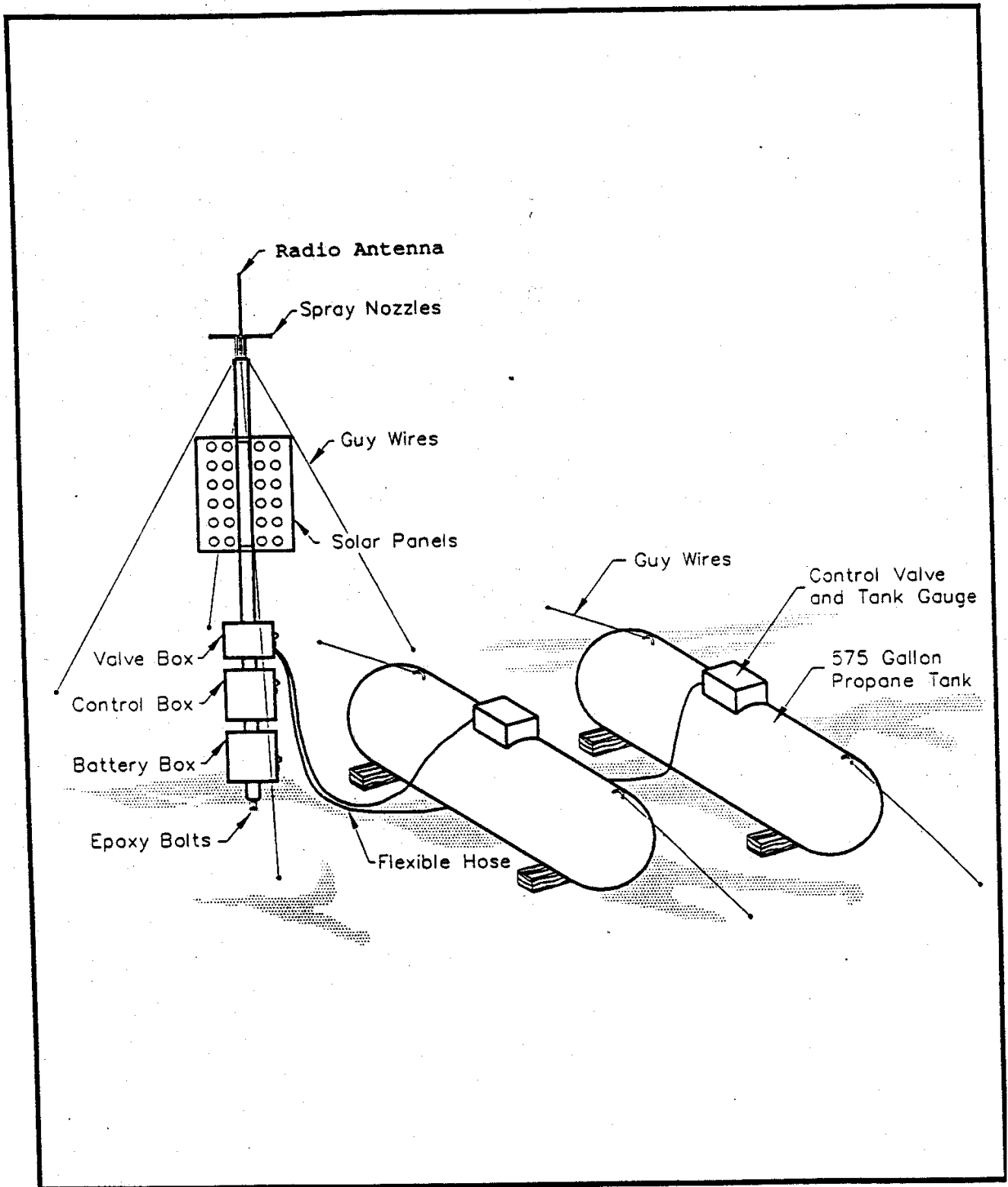


Figure 1. Sketch of Propane Seeding Dispenser Design and Site Set-Up.

5. Identify if there are any municipal supply watersheds within the project area, and, if so, the effects of the project on water quality in these watersheds.
6. Assure that the California Department of Fish and Game, and the U.S. Fish and Wildlife Service are consulted on this project.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

One of the objectives of this Final Supplement is to determine whether additional alternatives need to be considered as a result of the analyses of the appeal issues. Based on these analyses, there is no basis for considering additional alternatives beyond those discussed in the Final EIS for this project.

AFFECTED ENVIRONMENT

The affected environment is described on pages 28 to 38 of the Final EIS for the Prototype Project to Augment Snowpack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties (September 1990). In this document, 10 propane dispenser sites are proposed to be located on mountain tops in Plumas and Sierra Counties. The proposed primary target area for this 5-year prototype enhancement project is defined by the dispenser locations forming a northwest to southeast alignment generally following the Sierra Nevada Crest from Pilot Peak to the higher elevations above Gold Lake (Figure 2). The effective primary enhancement area is located almost totally within the Middle Fork of the Feather River drainage. The area of impact includes the Middle Fork of the Feather River as it traverses the area from Portola on the east to below Sloat on the west. The major streams discharging to the Middle Fork in this stretch of the river are all of catchment areas of Willow, Frazier, Gray Eagle, Jamison, Long Valley and Poplar Creeks. Due to the placement of the dispensers, three other streams will be partially impacted as their catchment areas are not entirely within the enhancement area relative to the tracks of the storms that can be seeded. These streams are the lower ends of Big Grizzly and Sulphur Creeks, and the upper catchment area of Nelson Creek, above the area designated as a wild trout stream.

Vegetation within the enhancement area includes ponderosa pine, sugar pine, douglas fir, red and white fir, incense fir, jeffrey pine, and oak woodlands. Other vegetation associations present are lodgepole pine, riparian deciduous, dry grasslands, pine-juniper woodlands, and wet meadows.

The communities of Sloat, Cromberg, Johnsville, Plumas-Eureka Estates, Mohawk, Blairsden, Delleker, Graegle, Clio, and Portola are located within the project boundaries. Elevations in the enhancement area range from 7,812 foot Mt. Elwell along the Sierra Nevada Crest to approximately the 4,000 foot level of the Middle Fork Feather River west of Sloat.

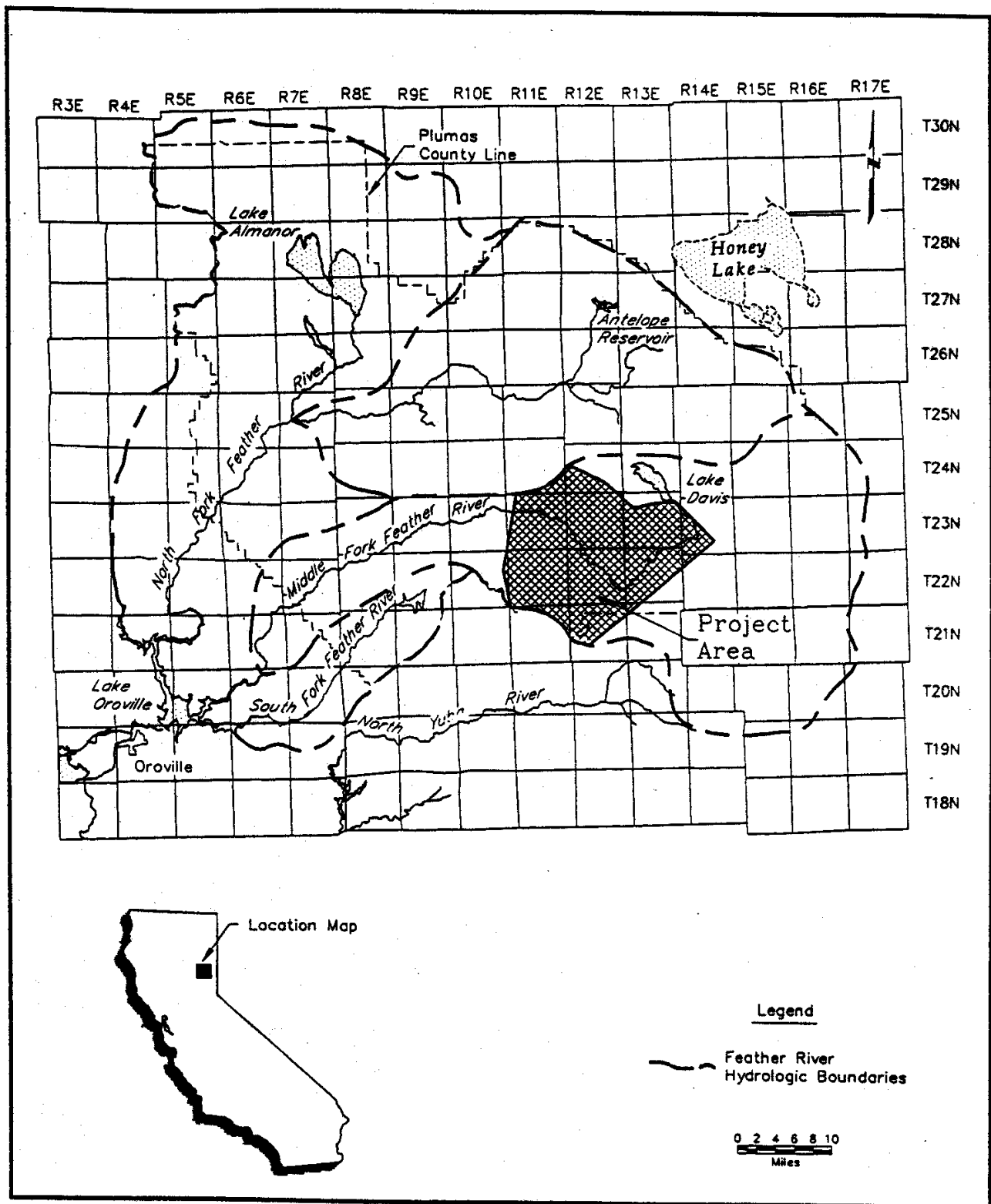


Figure 2. Location of Project Area for Snowpack Augmentation in Lake Oroville Catchment Area.

Mean monthly temperatures below freezing occur at Portola during the months of December and January. August, the warmest month, has an average daytime temperature of over 80° F. Portola, on the east side of the enhancement area, receives less than 20 inches of precipitation per year, which is significantly less than the westerly portion of the enhancement area which attains an annual average up to 60 inches per year.

ENVIRONMENTAL ISSUES

ISSUE 1. The EIS did not adequately describe the existing known data that can relate to the watershed condition and fisheries habitat of the third order streams mentioned in the California Sportfishing Protection Alliance and the Friends of Plumas Wilderness appeal. (Appeal Item 3b).

ISSUE 2. There was not an adequate description of the cumulative effects and the factors used in the cumulative watershed effects analysis on the third order drainages mentioned in the appeal. (Appeal Item 8b).

DIRECTION

Review the information provided, gathering landslide, channel, soils and fisheries data that are known to exist for the area and re-evaluate the effects of early snow melt on landslide and channel stability and fisheries resources.

Supplement the EIS with a cumulative watershed analysis on streams. It is important to know if any watersheds are over threshold, and if the incremental effect added by this project will adversely effect stream channel stability, landslides, bank failures, channel aggradation or degradation, or fish habitat. For watersheds that are over threshold, identify sensitive areas for watershed improvement and mitigation measures which would bring the watersheds to within the threshold of concern.

SUMMARY OF FINDINGS - ISSUE 1 AND 2

Many of the watersheds within the project area have been heavily impacted. These watersheds can develop significant problems in the future unless the current trend is reversed. These problems are not expected to be measurably increased, if at all, by the proposed cloud seeding project. Effects from the addition of the proposed cloud seeding program to the project area were determined to be negligible for the following reasons: 1) no change in ERA values, 2) no detectable adverse impacts, 3) cloud seeding will only occur in years of average or below average precipitation, 4) cloud seeding will only occur when precipitation is in the form of snow at or below 5,000 feet elevation, and 5) the use of stringent suspension criteria.

No adverse impacts to either instream or downstream beneficial uses were

identified. The proposed project should yield significant benefits to both instream and downstream beneficial uses.

DISCUSSION

The Plumas National Forest Land and Resource Management Plan (USFS 1988) directs that watersheds be protected from the effects of cumulative impacts. In compliance with this direction, cumulative watershed effects (CWE) analyses were conducted to determine if the effects of the proposed prototype snow augmentation project could contribute to the cumulative effects found in watersheds within the project area. The watersheds selected for CWE analyses were identified in the Regional Forester's Special Use Permit Appeal Decision, and include Jamison Creek, Poplar Creek, Nelson Creek, Graeagle Creek, Sulphur Creek, Willow Creek, Consignee Creek, Long Valley Creek, Jackson Creek, Rattlesnake Creek, Little Long Valley Creek, Greenhorn Creek, Estray Creek and Squirrel Creek watersheds. Staffs from the Plumas National Forest and Department of Water Resources agree with the appellants that the watersheds identified in the Regional Forester's Decision represent the most sensitive and or degraded watersheds within the project area.

These CWE analyses were conducted by Department of Water Resources personnel in cooperation with the U.S. Forest Service and follow the general format set forth in the Forest Service Handbook Section 2509.22. This method uses "equivalent roaded acres" (ERA) to serve as an index to measure the impact of past, present and future land management activities on downstream water quality and beneficial uses. This method of CWE analysis is comprised of three distinct steps. First, the amount of sensitive ground within a watershed is quantified based on the watersheds physical characteristics including climate, topography, slope, stream channel geomorphology, channel gradient, stream channel hydrology, soils, geology, elevation and physically and biologically sensitive land units. Second, the type, intensity, and chronology of management activities are collected and analyzed using the ERA methodology (Seidelman 1981). Third, a threshold of concern (TOC) is defined based on the relative natural sensitivity of the watershed. The existing or future ERA values are compared with TOC values to predict the risk of initiating cumulative effects.

Cumulative effects are defined as effects on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects can be singularly minor, but collectively significant actions which occur over a period of time.

The National Environmental Policy Act (NEPA) and Federal Clean Water Act (FCWA) mandate the assessment of cumulative effects of proposed projects.

Current ERA values, developed from recent CWE analyses, exist for Little Long Valley Creek, Rattlesnake Creek, Jackson Creek, Long Valley Creek, and Consignee

Creek. This CWE analysis will, therefore, concentrate on those watersheds where current ERA values do not exist, including Jamison Creek, Poplar Creek, Nelson Creek, Graeagle Creek, Sulphur Creek, Willow Creek, Greenhorn Creek, Estray Creek, and Squirrel Creek.

Beneficial Uses of Water

The beneficial uses of water within the project area include coldwater fish habitat, recreation, municipal, domestic and agricultural water supply and wildlife habitat. Additional downstream beneficial uses include warm water fish habitat, power generation, industrial use and reservoir storage for later agricultural and domestic uses.

The proposed snow augmentation project is designed to increase water yields for instream and downstream beneficial uses. The purpose of these CWE analyses are to determine where adverse cumulative effects associated with increased water yields to beneficial uses may exist and, if they exist, to quantify the relative magnitude of those adverse effects.

Water Quality Protection Criteria

To protect beneficial uses during the prototype snow augmentation project, suspension criteria have been developed. These criteria include: 1) suspension of all cloud seeding when the water content of the snowpack in the Feather River Basin, as measured at 25 snow courses in the basin, exceed the average historic April 1 total amounts by the following percentages: January 1 - 110 percent, February 1 - 130 percent, March 1 - 150 percent and April 1 - 160 percent; 2) suspension of all cloud seeding when quantitative precipitation forecasts issued by the National Weather Service indicate the potential for excessive runoff in the project area or downstream areas, as determined by the Flood Forecasting staff of the Department of Water Resources. These include forecasts of precipitation events at Quincy which exceeded 4 inches in 24 hours, 5 inches in 48 hours, or 6 inches in 72 hours; or (for backup) when the gauge amount at LaPorte is observed or predicted to exceed 5 inches in 24 hours, 6 inches in 48 hours, or 7 inches in 72 hours. The recurrence interval of precipitation events of this magnitude are 2.5 and 2.0 years respectively; 3) whenever an inflow of 60,000 cubic feet per second (cfs) or more into Oroville Reservoir is predicted or observed. The recurrence interval of this magnitude of inflow is approximately 2.0 years; 4) whenever Oroville Reservoir flood control space is encroached and significant releases (>20,000 cfs) are being made at Oroville Dam; 5) whenever flood flows or stages are occurring, or are forecast to occur, which exceed flood warning stages on the Feather River below Oroville; and 6) whenever the National Weather Service has issued a flash-flood warning for the project area or the DWR Project Director predicts conditions so hazardous as to warrant suspension of cloud seeding conditions including avalanche warnings.

The EIS states that the prototype snow augmentation project is designed to operate

primarily in years of average or below average precipitation. Cloud seeding will only occur when temperatures at the propane dispenser sites are less than -2.0°C (28.3°F) and precipitation falling at 5,000 feet or below is in the form of snow. These seeding and previously mentioned suspension criteria are designed to reduce or eliminate the risk of landsliding, avalanche, flooding, erosion, sedimentation and channel degradation problems created by the project and to maintain or improve water quality, fisheries habitat and other beneficial uses.

Watershed Size

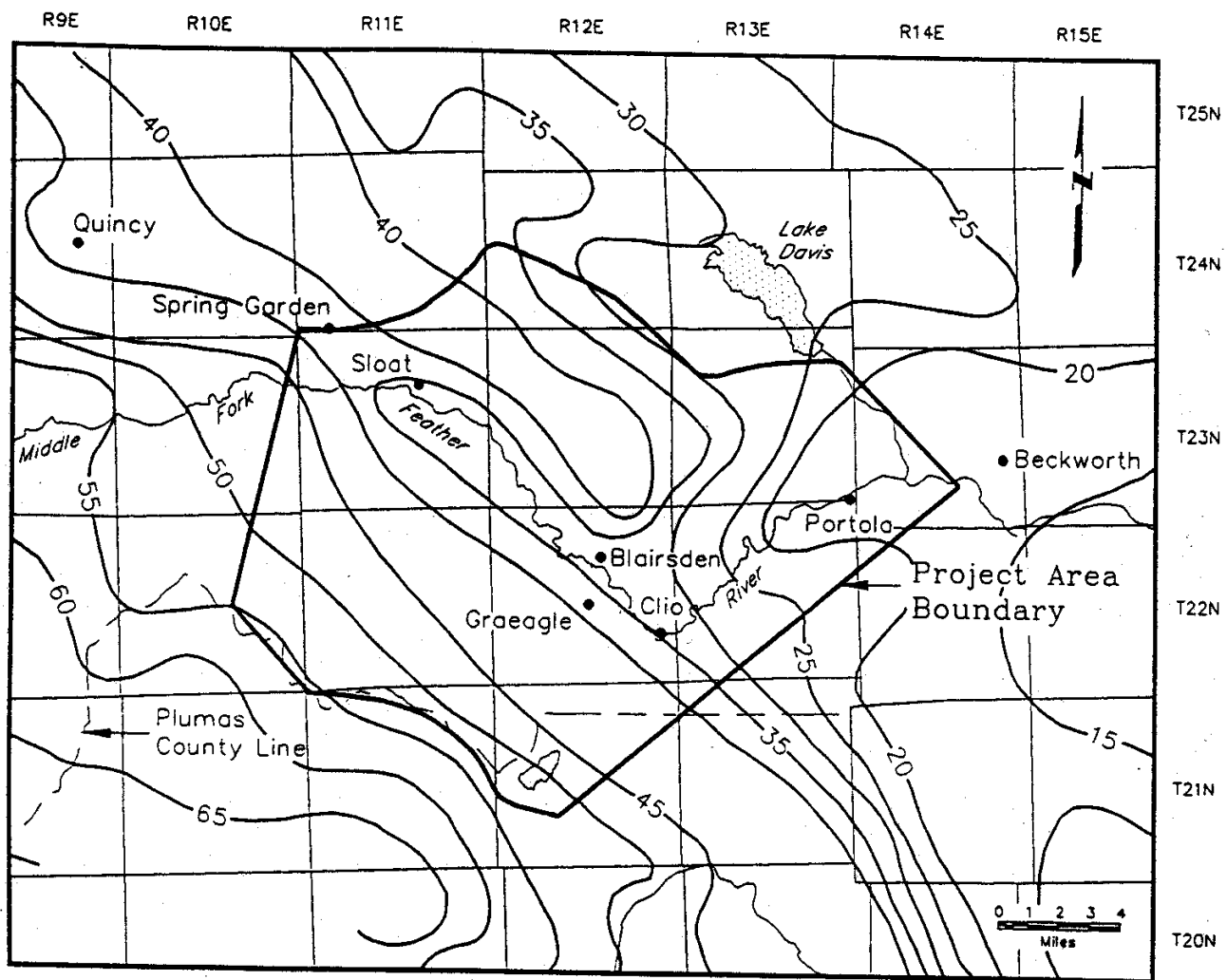
The project area, comprising approximately 165,000 acres, was delineated into a number of subwatersheds, averaging about 10,370 acres in size. These are larger than the size normally evaluated for CWE by the Plumas National Forest to determine the impacts of timber harvesting. Third order size watersheds are normally evaluated in order to best detect CWE impacts caused by the site-specific impacts. Because the effects of cloud seeding are widespread and the mechanisms that may cause CWE to occur from cloud seeding work over large watershed areas, larger subwatersheds were chosen for the analyses. The selected subwatersheds also best delineate the project area into logical units.

Due to the size of the project area, the beneficial uses of water resources and watershed characteristics present, third and fourth order size watersheds were selected for CWE analyses. We recognize that in analyses of watersheds of this size, the ability to evaluate the effects of distribution of activities are reduced. For example, clumping of land use activities in a small subwatershed may produce conditions which exceed TOC for that subwatershed, but the watershed as a whole may be well below TOC. In larger watersheds, it was necessary to reduce TOC levels to compensate for the "dilution" of impacts by a large area.

Watershed Characteristics

The project area lies within the Sierra Nevada Geologic Province. The geology of this province is very complex, consisting of alluvial deposits (Quaternary age), volcanic rocks (Cenozoic age), granitic rocks (Mesozoic age) and weakly metamorphosed sedimentary and volcanic rocks (Paleozoic and Mesozoic age). Geologic structure of the project area is highly complex due to extensive faulting and folding, erosion, deposition of sediments, igneous intrusive activity and volcanic activity. The geology largely defines the project area's physical topography, soil structure and erodibility, stream and hillslope hydrology, stream and hillslope geomorphology, and slope stability. Discussion of each of these watershed attributes and their response to land use follows.

Precipitation within the project area occurs mostly in the form of snow, and averages range from a high of over 60 inches per year along the south project boundary to less than 20 inches per year near Beckwourth (Figure 3). Precipitation occurs primarily from October through April with cold wet winters and dry, warm



(DWR 1966)

Figure 3. Lines of Equal Precipitation in Project Area (In Inches).

summers. Snowpack of 5 to 10 feet, or more, frequently occurs during the winter above 5,000 to 6,000 feet elevation. Land disturbance activities in areas of low annual precipitation require longer recovery periods due to the relative slowness of vegetative recovery. High elevation sites within the project also exhibit longer recovery periods due to the shorter growing season of vegetation. Intense summer thunderstorms occur occasionally and have been documented to be a significant factor in erosion and sediment production. The effects of these storms are localized and more pronounced on the areas of low annual precipitation.

Climatic regime (broadly defined as zones dominated by precipitation in the form of snow, rain on snow, or rain) is the key climatic factor in this CWE analysis. The project area was selected due to the high percent of snow dominated zone relative to rain dominated zone (Figure 4). The project's influence on each of these zones was identified during the environmental review process as an area of significant public interest.

The physical topography of the project area is steep mountainous terrain with a small number of alluvial valleys. Elevations range from over 7,500 feet on the north and south project boundaries to less than 4,000 feet near Spring Garden.

Slopes greater than 60 percent occur throughout the project area (Figure 5), and, of those, many are at risk of landsliding and surface erosion. Less than two percent of Willow Creek, Squirrel Creek, Estray Creek, Sulphur Creek and Graeagle Creek watersheds contain slopes greater than 60 percent. Jamison Creek, Poplar Creek and Greenhorn Creek watersheds contain between two and four percent of their area in slopes greater than 60 percent. Nelson Creek contains nearly 10 percent of its area in slopes greater than 60 percent. The project area is not considered steep compared to most watersheds in the Sierra Nevada Mountains, but enough steep areas exist to make slope instability a consideration.

Inner gorge zones are a geomorphic feature consisting of oversteepened slopes (herein defined as 60 percent or greater) adjacent to a stream channel. Debris slides and rockfalls naturally occur in these sensitive zones, affecting channel stability and downstream sedimentation. Willow Creek, Estray Creek and Squirrel Creek watersheds contain no inner gorge features (Figure 6). The percent area of inner gorge zone features is highest in the Nelson Creek watershed at 2.5 percent. Except for within Nelson Creek, inner gorge features are not a major concern.

Landslides, both active and inactive exist throughout the project area, but in relatively low numbers and sizes. Landslides can result in channel changes through aggradation and degradation processes. Landsliding can deflect stream channels and produce additional changes through scouring or trigger additional landslides by deflecting stream flows against opposite slopes. The Graeagle Creek watershed contains no known landslide features (Figure 7). Watersheds with less than one percent of their area in landslide features include Willow Creek, Poplar Creek,

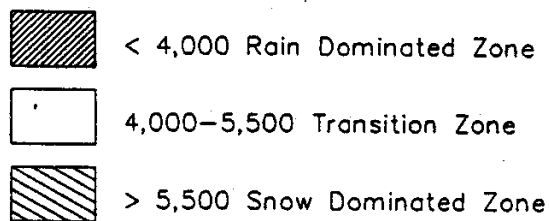
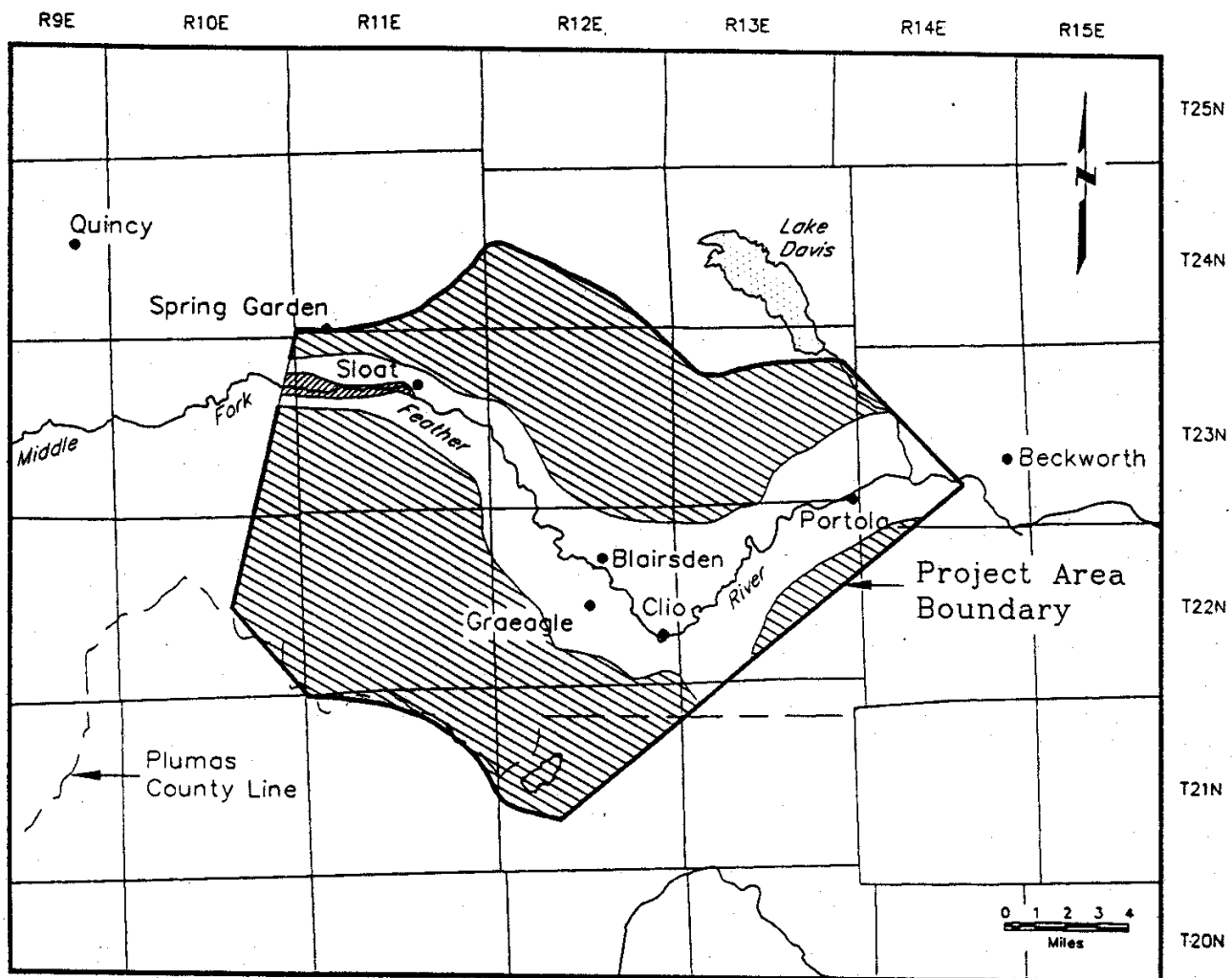


Figure 4. Approximate Locations of Climatic Zones in the Project Area.

Figure 5. Percent area of each watershed containing slopes over 60%.

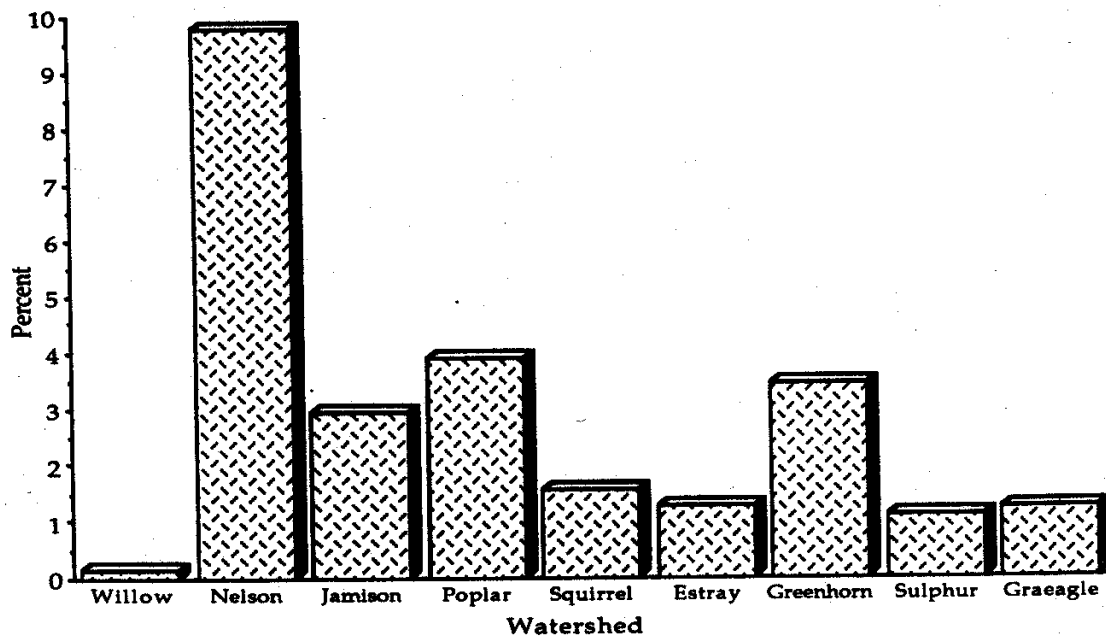


Figure 6. Percent area of each watershed classified as inner gorge zone.

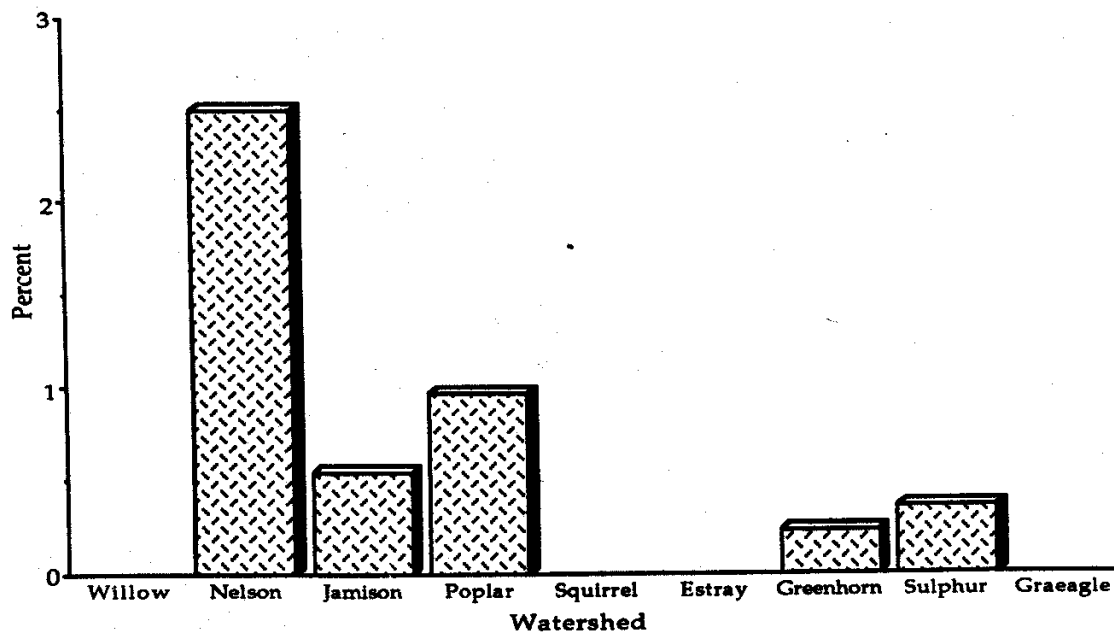
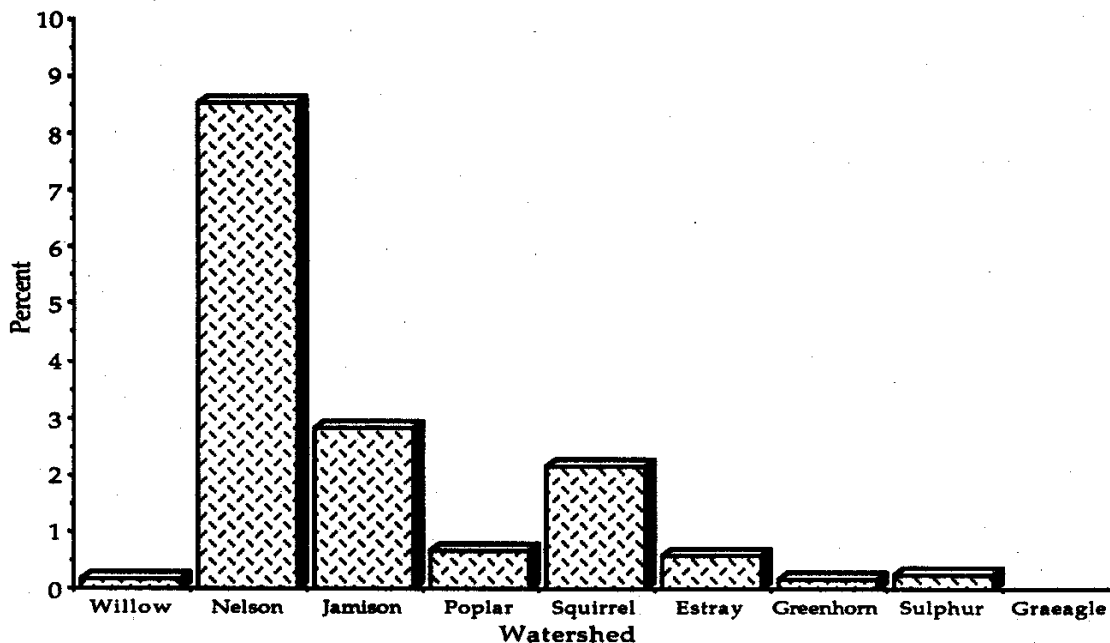


Figure 7. Percent area of each watershed classified in a landslide condition.



Estray Creek, Greenhorn Creek, Sulphur Creek, and Graeagle Creek. Squirrel and Jamison Creek watersheds each contain between two and three percent of their area in landslide features. Over 8.5 percent of the Nelson Creek watershed is occupied by landslides. Landslides are classified as active or inactive. Although active landslides are most likely to be affected by land disturbance or changes in precipitation, it is possible to reactivate inactive landslides.

The variation of geologic parent material, slope, aspect and climate have produced a diversity of soils within the project area. Soils in the western portion of the project area are generally deeper and more productive than eastside soils. Soils on northern exposures are generally deeper, moister and more productive than soils on southern exposures. Soils having high to very high erosion potentials are present in every watershed within the project area (Figure 8). The Graeagle Creek watershed contains the highest percentage (63 percent) of soils classified high to very high erosion potential. Willow Creek contains the lowest percent of soils in the high to very high soil erosion potential classes at 2.5 percent. Highly and very highly erosive soils can be adversely effected by land use activities through soil compaction and exposure to erosional mechanisms.

Riparian areas (including off-channel wetlands) are biologically and physically important and sensitive land units. Riparian areas (which frequently occur on alluvial deposits) are sensitive to land use activities because their soils are very highly erosive, which can lead to gullyng, increased peak flows, and lost habitats. The percentage of each watershed classified as riparian ranges from 2 percent on the

Willow Creek watershed to 5.7 percent on the Nelson Creek watershed (Figure 9).

Figure 8. Percent of soils with high to very high erosion potential in each watershed.

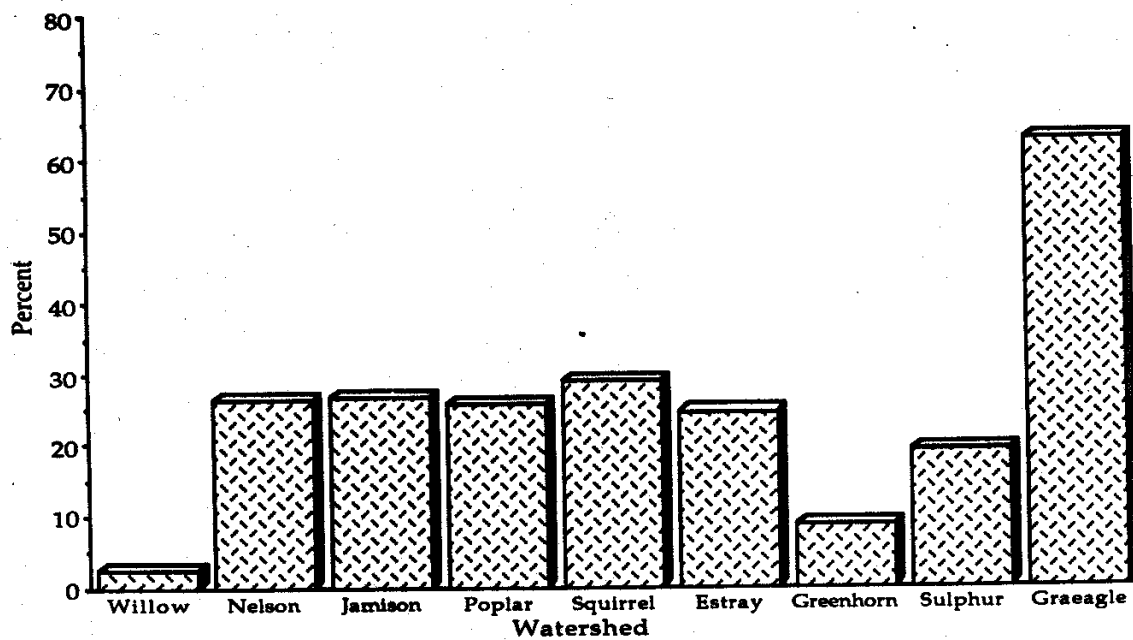
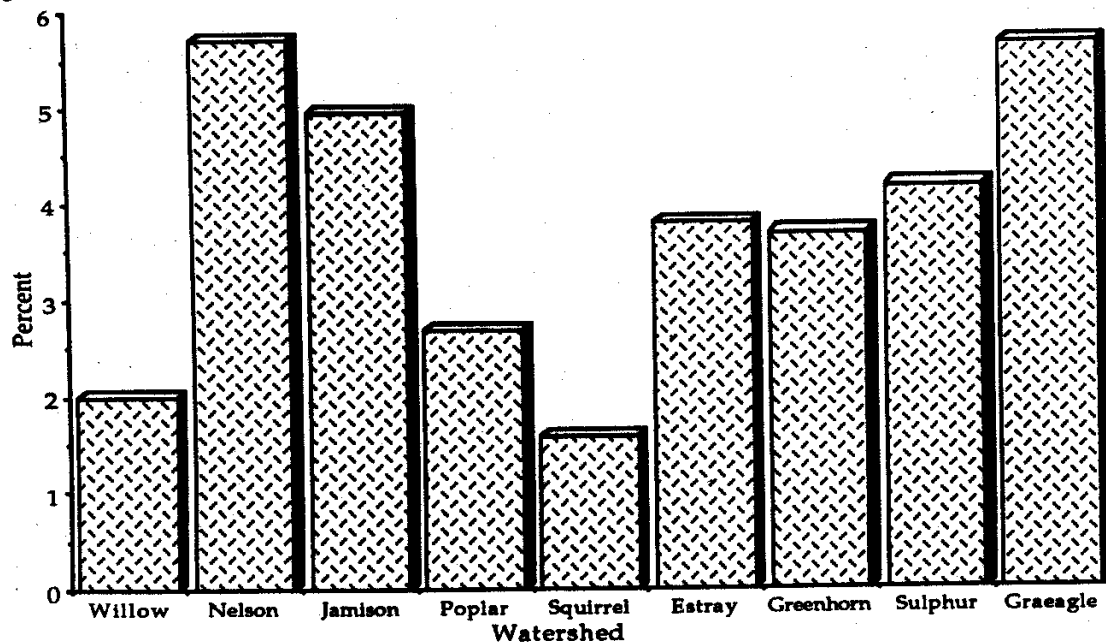


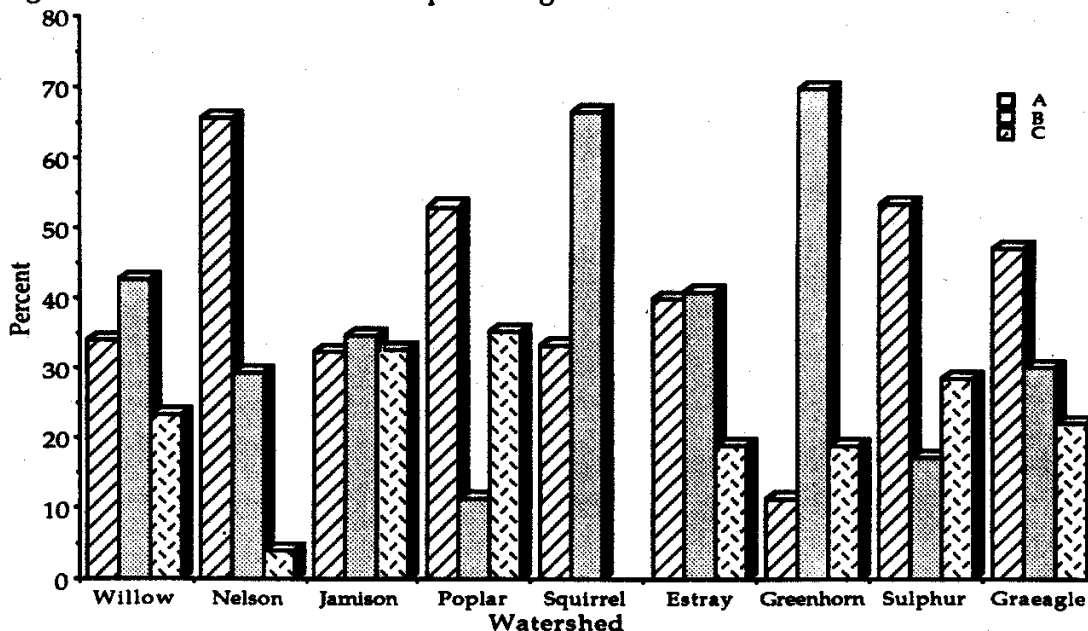
Figure 9. Percent area of each watershed classified riparian.



Streams present in the project area are classified "A", "B" or "C". This classification is based on the morphological criteria of gradient, width to depth ratio, sinuosity, channel materials, channel confinement, entrenchment, soils, and land form (Rosgen 1985). "A" type streams are steep, with very deep, well defined, confined channels, water slopes (gradients) of 4 to 10 percent, and width to depth ratios of 10 or less. "B" type streams are generally of moderate gradient, moderate to well confined channels, moderately to deeply entrenched channels with gradients of 1.5 to 4.0, and highly variable width to depth ratios (0.1 to 25). "C" type stream channels have low gradients, are unconfined with moderate to shallow channel entrenchment and width to depth ratios generally less than 10.

"A" type stream channels are present in every watershed and exhibit rapid response to major storm events. These stream channels are sensitive to landsliding. "A" type stream channels are major sources of sediment to "B" and "C" type stream channels. Nelson Creek, Poplar Creek, and Sulphur Creek watersheds contain over 50 percent of their total stream miles in "A" type stream channels (Figure 10). "B" type stream channels are sensitive to flooding and channel scouring during very high flows and loss of riparian vegetation. Greenhorn Creek and Squirrel Creek watersheds contain a relatively high percent (>65%) of "B" type channels. "C" type stream channels are generally the least common in the project area and are associated with meadows, such as those found in Sulphur Creek. "C" type stream channels are highly sensitive to erosion and channel degradation resulting from increased peak flows and loss of riparian vegetation. Jamison Creek and Poplar Creek watersheds contained the highest percent of stream channels classified as "C" type.

Figure 10. Stream classification percentages for each watershed.



Mechanisms for Initiating CWE's

Total ground disturbance related to installation of precipitation gauging stations, propane dispensers and propane tank storage are less than one acre. The proposed prototype snow augmentation project will not alter present or future ERA values. No roading or other forms of ground disturbance (other than the one acre mentioned above) will occur.

The project is designed to increase precipitation during years of average to below average precipitation. Approximately 2/3 of the water produced is predicted to leave the project area as runoff while the remaining 1/3 is expected to be taken up by ground water recharge and vegetative transpiration. The availability of increased soil water during years of below average precipitation is expected to reduce plant stress and possibly increase growth rates. These changes could reduce drought and insect losses of commercial timber, thus reducing the extent of salvage logging. Other secondary benefits include accelerated recovery of vegetation on disturbed sites, possible wildfire reduction, a slight increase in the amount of time stream flows are up, and increased summer flows, thereby enhancing the fishery.

We expect the secondary effects of the project to be largely beneficial. However, the magnitude of this benefit remains unquantified and probably undetectable.

Monitoring of other cloud seeding projects (Kattleman 1986) indicates that the adverse watershed effects of snow augmentation, assuming a 10 percent increase in snow-water content over a 6 to 7 month period, are probably undetectable. The suspension criteria employed is expected to further reduce the occurrence of adverse impacts. For the following reasons the cumulative effects of this cloud seeding program were judged in the EIS to be negligible: 1) no changes in ERA values; 2) no detectable adverse impacts; and 3) the use of very stringent suspension criteria.

The primary mechanism that could initiate CWE's is not expected to occur under normally prescribed operations. This analysis looked at a "worst case" development. Fifteen and 50-year rain on snow events were projected with and without the project. The probability of a 15-year rain on snow event occurring within a given year of the five year prototype project is 1 in 15, or 7 percent. The potential mechanisms for initiating CWE during major rain on snow events were identified through an interdisciplinary scoping session and include: 1) increased peak flows due to rapid snowmelt, and 2) increased risk of landsliding from increased peak flows eroding the toes of landslide prone areas or from increased soil saturation weakening landslide prone areas.

Watershed History

Land use impacts increased significantly beginning in the 1850s. Early land use impacts were generally related to mining activities. Small seasonal communities surrounding placer mining areas occurred along Nelson Creek, Poplar Creek,

Jamison Creek, Squirrel Creek, Graeagle Creek and along the Middle Fork Feather River. Early placer mining impacts were generally limited to in-channel disturbances. Subsequent hydraulic mining involved water diversion and rechannelization causing massive erosion and sedimentation. Booming (a form of hydraulic mining where upstream water sources were diverted over a slope to erode mineral bearing materials) was common in the Poplar Creek drainage. Small permanent communities (5 to 6 individuals or families) were established near hydraulic mining operations. Larger permanent communities developed adjacent to hard rock mining operations in the Eureka and Chris Peaks areas. Hard rock mining required massive amounts of timber (10 acres of mature forest per mile of mine) for mine supports, steam power to run equipment and pump water, and housing. Slopes adjacent to hard rock mines were clearcut.

Historical accounts indicate that during the 1850s the project area contained open stands of mature pine with an herbaceous understory. The majority of the project area was intensively grazed by sheep and to a lesser extent by cattle in the late 1800's. Low intensity wildfires were common and served to maintain the open pine stands. Intensive grazing has continued to decrease as a land use activity in the project area since the 1930s, primarily due to degraded pasture lands and improvements in grazing strategies.

Localized intensive timber harvesting in support of mining activities continued until 1910. During 1910, the Western Pacific Railroad was completed through the project area and large scale logging commenced. Railroad logging (involving clear cutting within 1/4 to 1/2 mile of railroad spurs) occurred in the Squirrel Creek watershed. A grease chute for transporting timber to the railroad was established in the Greenhorn and Estray Creek watersheds. The scars from this chute are still visible today.

Massive destructive wildfires became increasingly common during the 1930s and 1940s. Succession brushfields and logging slash fueled these wildfires.

Historical records indicate that the effects of these large scale land use impacts were severe as early as 1856 when an American Valley farmer reported fish kills and sediment covering his fields.

Recovery from approximately 80 years of resource exploitation is occurring. However, forest ecology and watershed characteristics have been altered to a less stable condition which is far more sensitive to current land use activities than those believed to have existed prior to 1850.

Roading for timber harvest purposes began in the late 1800s and continues today. Roads currently represent the single greatest land use impact to watershed stability and water quality degradation.

More recent land use changes include increased rural subdivisions and reduced

average ranch size. Subdivision development within the project area began during the 1960s and continues today. Subdivision and housing development activity within the project area has been greatest in the Graeagle Creek watershed.

Natural Watershed Sensitivity

Natural watershed sensitivity is an estimate of a watershed's natural ability to absorb land use impacts. Generally, natural sensitivity to land use increases as the percentage of sensitive areas in the watershed increases. However, even sensitive land units do not contribute equally to a watershed's sensitivity.

To estimate each watershed's natural sensitivity to the proposed cloud seeding program, the prime indicators of natural sensitivity were compiled into sensitivity matrices (Tables 1 through 9). Each factor was weighted to reflect its contribution to watershed sensitivity.

Sensitivity analyses weights were assigned independently by three U. S. Forest Service hydrologists and one Environmental Specialist from the Department of Water Resources. The rationale for factor weights and changes in the matrix were submitted by each rater. The following discussion summarizes the rationale for factor weights and changes to the matrix.

The "erosion hazard rating" (EHR) factor was rated moderate (5), because the project is unlikely to affect rainfall intensity. Surface erosion is usually influenced by precipitation events with high intensities. Erosion studies conducted on the East Branch North Fork Feather River reveal that surface erosion (on undisturbed sites) is an insignificant source of stream sedimentation (SCS 1988).

The "percentage of stream miles classified as "B" or "C" type" received a moderate (5) rating. "B" and "C" type channels contain alluvial material which is very highly erosive when their vegetative cover is degraded. This factor is primarily important to provide perspective on the percentage of stream types "B" or "C" in degraded condition factor. For example, if 95 percent of the "B" and "C" type channels in a watershed are in a degraded condition, it is important to know whether "B" and "C" stream type channels comprise 5 or 100 percent of the watershed.

The "percentage of stream channels classified as "B" and "C" types in a degraded condition" factor was rated as important (9) due to their sensitivity to increased peak flows. This and the above factor can indicate channel sensitivity when these channel areas are gullied. This factor can directly impact water quality and fisheries habitat.

The "percentage of the watershed classified as riparian" factor was rated low (2). This factor is used as an indicator of alluvial material located in the stream channel. The presence of alluvial material in the stream channel is not in itself an indicator of erosion or sedimentation problems. However, should the stream channel

Table 1. Watershed sensitivity rating for Squirrel Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High	SCORE	WEIGHTED SCORE
		0	• • • • • 1	• • • • • 2	• • • • • 3			
Percent of watershed having HIGH to very HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	2		10
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3		15
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3		27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	1		2
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	0		0
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0		0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	2		20
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	<5000'	2		10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	>50"	2		8
TOTALS	52							92

$$\text{AVERAGE RATING} = (\text{SUM OF WEIGHTED SCORES}) / (\text{SUM OF FACTOR WEIGHTS}) = 1.77$$

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 2. Watershed sensitivity rating for Greenhorn Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low ••••• ••••• High				SCORE	WEIGHTED SCORE
		0	1	2	3		
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	0	0
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3	15
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	0	0
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	2	4
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	1	6
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	3	15
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	2	8
TOTALS	52						68

$$\text{AVERAGE RATING} = (\text{SUM OF WEIGHTED SCORES}) / (\text{SUM OF FACTOR WEIGHTS}) = 1.30$$

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 3. Watershed sensitivity rating for Estray Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High 3	SCORE WEIGHTED SCORE
		0	• • • • • 1	• • • • • 2			
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	2	10
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3	15
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	2	4
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	0	0
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	2	8
TOTALS	52						84

AVERAGE RATING = (SUM OF WEIGHTED SCORES)/(SUM OF FACTOR WEIGHTS) = 1.62

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 4. Watershed sensitivity rating for Willow Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High	SCORE WEIGHTED SCORE
		0	1	2	3		
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	0	0
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3	15
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	1	2
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	0	0
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	1	4
TOTALS	52					1.31	

$$\text{AVERAGE RATING} = (\text{SUM OF WEIGHTED SCORES}) / (\text{SUM OF FACTOR WEIGHTS}) = 1.31$$

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 5. Watershed sensitivity rating for Nelson Creek.

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High	SCORE	WEIGHTED SCORE
		0	• • • • • 1	• • • • • 2	• • • • • 3			
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	2	10	
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	2	10	
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	1	9	
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	3	6	
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	2	12	
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	1	5	
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	3	30	
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10	
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	3	12	
TOTALS	52						104	

AVERAGE RATING = (SUM OF WEIGHTED SCORES)/(SUM OF FACTOR WEIGHTS) = 2.00

DESCRIPTIVE RATING = MODERATE/HIGH

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 6. Watershed sensitivity rating for Poplar Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High	SCORE WEIGHTED SCORE
		0	1	2	3		
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	2	10
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	2	10
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	1	2
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	1	6
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	2	8
TOTALS	52						83

$$\text{AVERAGE RATING} = (\text{SUM OF WEIGHTED SCORES}) / (\text{SUM OF FACTOR WEIGHTS}) = 1.6$$

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 7. Watershed sensitivity rating for Jamison Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)					High 3	SCORE WEIGHTED SCORE
	Low 0	• • • • • 1	• • • • • 2	• • • • • 3	High 3		
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	2	10
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3	15
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	3	6
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	1	6
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	2	8
TOTALS	52						92

AVERAGE RATING = (SUM OF WEIGHTED SCORES)/(SUM OF FACTOR WEIGHTS) = 1.77

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 8. Watershed sensitivity rating for Graeagle Creek.

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low				High	SCORE	WEIGHTED SCORE
		0	• • • • • 1	• • • • • 2	• • • • • 3			
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	3	15	
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	3	15	
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27	
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	3	6	
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	0	0	
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0	
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	0	0	
Mean elevation	5	> 6000'	5500-6000'	5000-5500'	< 5000'	2	10	
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	2	8	
TOTALS	52						75	

AVERAGE RATING = (SUM OF WEIGHTED SCORES)/(SUM OF FACTOR WEIGHTS) = 1.44

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

Table 9. Watershed sensitivity rating for Sulphur Creek

WATERSHED SENSITIVITY FACTOR	FACTOR WEIGHT (1-10)	Low • • • • • • • • • • High				SCORE	WEIGHTED SCORE
		0	1	2	3		
Percent of watershed having HIGH to VERY HIGH EHR	5	< 10%	10%-20%	21%-40%	> 40%	1	5
Percent of stream miles in stream types B and C	5	< 10%	10%-25%	26%-50%	> 50%	2	10
Percent of all B and C type streams in DEGRADED condition	9	< 5%	5%-15%	16%-25%	> 25%	3	27
Percent of watershed classified as RIPARIAN	2	< 1%	1.1%-3.0%	3.1%-5.0%	> 5.0%	2	4
Percent of watershed classified as INNER GORGE ZONE	6	0%	0.1%-2.0%	2.1%-4.0%	> 4.0%	1	6
Percent of watershed over 60 % slope	5	< 5%	6%-10%	11%-20%	> 20%	0	0
Percent of area occupied by landslides	10	0%	0.1%-3.0%	3.1%-9.0%	> 9.0%	1	10
Mean elevation	5	> 6000'	5500'-6000'	5000'-5500'	< 5000'	1	5
Mean annual precipitation	4	> 20"	21"-34"	35"-49"	> 50"	1	4
TOTALS	52						71

$$\text{AVERAGE RATING} = (\text{SUM OF WEIGHTED SCORES}) / (\text{SUM OF FACTOR WEIGHTS}) = 1.36$$

DESCRIPTIVE RATING = MODERATE

Low	0.0-0.6
Low/Moderate	0.7-1.2
Moderate	1.3-1.8
Moderate/High	1.9-2.4
High	2.5-3.0

become degraded, these alluvial deposits represent an in-channel source of sediments which can rapidly degrade water quality through stream side-cutting processes.

The "percentage of the watershed classified as inner gorge zone" (i.e., adjacent to the stream channel and over 60 percent slope) factor was rated slightly above moderate (6). Inner gorge zones are sensitive to land disturbance activities. Cloud seeding will not introduce any site disturbance in this zone. Inner gorge zones in the project area frequently contain landslide features which could be influenced by the project through increased peak flows or increased soil moisture.

The "percentage of the watershed over 60 percent slope" factor received a moderate (5) rating. Most of the areas containing slopes greater than 60 percent are also included in the high to very high erosion hazard rating, inner gorge zone or landslide factors. This factor was given a moderate rating because it influences storm water travel times and slope stability.

The "percentage of the watershed classified in a landslide condition" (both active and inactive) received the maximum weight (10) because it is the prime indicator of watershed sensitivity from a cloud seeding program. Landslides can directly impact water quality and fisheries habitat. A single active landslide can contribute more sediment than all other sources in a watershed.

The "mean elevation" factor received a moderate rating (5). Most sensitivity analyses score higher elevations as more sensitive to disturbance due to the shorter growing season and subsequent longer recovery period following disturbance. However, lower elevations are more likely to be adversely impacted by a major rain on snow event (a prime concern to the appellants). For this reason, lower elevations received a higher score in the sensitivity analyses.

"Mean annual precipitation" received a moderate rating (4), as precipitation amount can influence vegetation, landsliding and channel stability. Like the previous factor, most sensitivity analyses score areas with less annual precipitation higher due to the longer recovery period following disturbance. Negligible site disturbances will be produced by this project. Higher precipitation areas received a higher score in this CWE analysis due to the greater potential for a rain on snow event. Increased precipitation is less likely to induce channel degradation, or landsliding in areas of low average annual precipitation.

Water Tolerance to Land Use

When a watershed's tolerance to the accumulation of land uses reaches a threshold, significant downstream degradation is expected to occur. This "threshold of concern" (TOC) is expressed in equivalent roaded area (ERA) percentages. The ERA methodology assumes that watersheds can tolerate a given level of land disturbance without a substantial impact to downstream beneficial uses and that the

approximate point where adverse effects begin to occur can be identified. TOC represents the upper limits of a watershed's tolerance to land use before degradation of downstream beneficial uses begin to occur. Since a watershed's actual threshold cannot be determined, a level of concern, called TOC, is determined. Forest Service policy recommends investigation or action when an ERA value reaches 50 to 60 percent of TOC.

TOC's were developed for each watershed by the cloud seeding interdisciplinary (I.D.) team and are based on current professional consensus (Table 10). These TOC values were significantly reduced from those historically employed on the Plumas National Forest and in the U.S.F.S. Soil and Water Conservation Handbook. The larger the watershed area, the more dilute the effects of the impacts that occur in it. Those TOC values normally used by the Plumas National Forest were estimated for much smaller watershed areas. To account for the larger watershed areas and the dilution affect, lowered TOC values were developed.

Table 10. Threshold of Concern "TOC" Values

<u>Watershed</u>	<u>TOC Value</u>
Squirrel Creek	10
Greenhorn Creek	10
Estray Creek	10
Willow Creek	9
Nelson Creek	8
Poplar Creek	10
Jamison Creek	9
Graeagle Creek	10
Sulphur Creek	9
Long Valley Creek	12
Little Long Valley Creek	12
Consignee Creek	12
Jackson Creek	12

Land Use Activities

Different types and intensities of land disturbance activities obviously result in highly variable watershed impact. Each forest has developed local, area specific disturbance coefficients representative of the range of values that each type of activity can be expected to produce. These coefficients are related to the amount of disturbance created by one acre of road.

The cloud seeding I.D. team analyzed CWEs using a conservative approach. Areas impacted and coefficients used to identify relative impacts are slightly inflated to account for unaccounted, but expected, impacts. The criteria and assumptions used in this CWE analysis are identified below.

"Roads" include all highways, secondary roads, jeep trails, railroads, power lines, log landings and cow trails visible on 1 to 30,000 scale aerial false color infra-red photographs. Each "road" was assigned a prism width of 35 feet and an ERA

coefficient value of 1.0. This width tends to significantly overestimate the acreage of jeep trails, skid trails, cow trails and secondary roads on slopes less than 30 percent and under estimates highways, railroads, log landings, and roads on slopes steeper than 45 percent. Assuming a coefficient value of 1.0 over the entire road prism also tends to overestimate the compaction generally found on fill slopes within the road prism but helps to account for the oversteepened, usually bare road prism cut slopes.

Subdivision developments were outlined on the infra-red photographs. Miles of roads within the outlined subdivision were calculated and doubled to compensate for the presence of impervious structures and compaction associated with human occupation (i.e. roofs, sidewalks, patios, etc.). Subdivision values are included as roads in the ERA calculations. Subdivisions were identified in several watersheds including Graeagle Creek, Jamison Creek, Willow Creek and Sulphur Creek.

All timber harvest activities on public and private lands since 1981 were compiled and included in this CWE analysis. USFS records were the source of timber harvest information on public lands. California Department of Forestry and Fire Protection Timber Harvest Plan files were the source for timber harvest activities on private lands. Ten years was selected as the temporal limit based on observed recovery rates of logged or burned areas on the Plumas National Forest. Transect data indicate that within 10 years of these types of land disturbances, vegetative recovery is at 95 to 100 percent of pre-disturbance levels (Ken Robie, USFS Hydrologist, pers. comm.). However, as a conservative approach, timber harvest recovery curves used for the last decade of timber harvest are those developed for the Last Chance Creek watershed (Cawley 1991). The Last Chance Creek watershed receives 18 to 30 inches of precipitation annually and is classified as semi-arid. Lower annual precipitation in the Last Chance Creek watershed produces longer recovery periods (25 to 40 years) following disturbance than those found in the majority of the project area. Vegetative recovery within the project area should be more rapid than is projected by these conservative recovery curves.

Proposed timber harvest on public lands through 1993 are included in the current ERA value. Projected ERA values for public lands timber harvest included planned timber harvest during 1994, 1995 and 1996. Future ERA values for public lands timber harvest were calculated using a typical 10 million board feet sale which involves three miles of new road construction, tractor logging of 200 acres of clearcut and 500 acres of intermediate harvest. Current private timber harvest information includes only those timber harvest plans on file with the CDF. Private timber management companies were contacted directly to develop estimates of future timber harvest activities on private lands within the project area. These companies were unable to project their harvest plans which respond rapidly to current market prices. To project private lands timber harvest over the next five years (the life of the prototype cloud seeding project), the watershed with the highest private lands timber harvest ERA per acre of private timber land over the last ten years was used as a model. This rate of harvest was applied to each watershed over the next five years to develop projected ERA values.

Timber harvest ERA coefficients employed include 0.35 for tractor logged clearcuts and 0.20 for tractor logged intermediate cuts and salvage sales. These values represent the maximum in the range of coefficient values developed for timber harvest on the Plumas National Forest. These coefficient values take into account all timber management activities including site preparation.

No grazing coefficients have been developed on the Plumas National Forest. The Lassen National Forest uses coefficient values of 0.01 to simulate moderate grazing effects and 0.02 to represent more intensive grazing. These coefficient values were developed relative to other land use impacts rather than from transect data. The interdisciplinary team for the cloud seeding CWE study modified these values to 0.05 for moderate grazing and 0.1 for more intensive grazing. No recovery coefficients were employed in areas currently being grazed. Acres grazed and intensities were identified from range allotment data files, air photos, site visits, and discussion with USFS resources personnel.

Large wildfires occur infrequently within the project area, but can remove vegetation from large areas. Hydrophobic soils, a condition which reduces the rate of precipitation infiltration into soils is common during the first year following wildfires. Wildfire locations were identified from the USFS fire atlas. Subsequent salvage logging impacts were added to burn coefficients. Recovery coefficients were used to simulate vegetative recovery following wildfire.

Mining impacts including hydraulic mining scars, mine tailings, and gravel removal were identified from air photos and through discussion with district resources personnel. Mining impacts were assigned a coefficient value of 1.0, and no recovery coefficients were used. No change in the ERA values for mining or grazing are projected due to their ongoing nature. Natural disturbances such as wildfire are not projected.

Current ERA calculations are presented in Appendix A (Tables 1 through 9). Projected ERA calculations through the 1996-1997 water year are presented in Appendix A (Tables 10 through 22). A composite summary of TOC, current and projected ERA and current and projected percent of TOC are presented in Table 11.

CWE Susceptibility Evaluation

One watershed within the project area is currently over TOC (Figure 11). Jackson Creek watershed was largely denuded by wildfire during 1989. Salvage logging further impacted this watershed during 1990 and 1991. Subsequent vegetative recovery following these impacts has occurred, but the current ERA value remains approximately 74 percent greater than the TOC. Projected vegetative recovery data indicate that, barring unplanned disturbance, the Jackson Creek watershed will remain over TOC until approximately 1994. Beneficial uses have been impacted in this watershed. Increased erosion, sedimentation, peak flow, and water temperature have degraded the coldwater fishery within Jackson Creek. No degradation of water

Table 11. Summary of TOC and Current and Projected ERA Values

Watershed	TOC	Current ERA	Current % of TOC	Projected ERA	Projected % of TOC
Squirrel Creek	10	5.1	51.0	9.5	95.0
Greenhorn Creek	10	6.9	69.0	9.1	91.0
Estray Creek	10	5.7	57.0	7.3	73.0
Willow Creek	9	6.9	76.6	7.3	81.1
Nelson Creek	8	2.0	25.0	2.8	35.0
Poplar Creek	10	3.9	39.0	6.8	68.0
Jamison Creek	9	3.6	39.9	3.3	36.7
Graeagle Creek	10	3.5	35.0	3.5	35.0
Sulphur Creek	9	7.6	84.4	8.9	98.9
Long Valley Creek	12	10.9	90.8	12.6	104.9
Little Long Valley Creek	12	9.5	79.2	9.8	81.6
Consignee Creek	12	11.2	93.3	11.3	94.2
Jackson Creek	12	20.9	174.9	11.0	91.6

quality or coldwater fish habitat quality within the Middle Fork Feather River downstream from Jackson Creek have been observed.

Flood flows due to a wet year, an intense summer thunderstorm, or a landslide could retard the recovery of this watershed or damage it permanently.

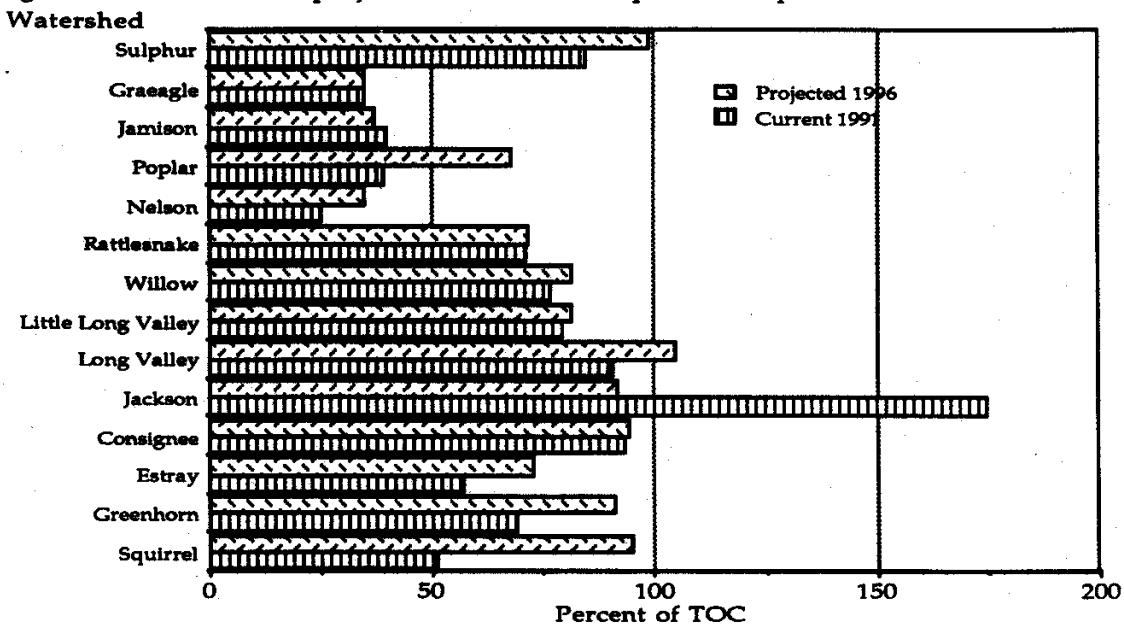
Consignee Creek, Long Valley Creek, and Little Long Valley Creek are all approaching TOC. No adverse effects to any beneficial use are apparent. Long Valley Creek is considered to possess an excellent coldwater fishery (Leslie Mink, USFS Fishery Biologist, pers. comm.). No fisheries data have been collected on Little Long Valley Creek or Consignee Creek. Consignee Creek may not contain a fishery due to stream barriers at the mouth (Tom Ratcliff, USFS Wildlife Biologist, pers. comm.).

Projected ERA values (Figure 11) indicate that by 1996-1997, the watersheds of Squirrel Creek, Greenhorn Creek, Sulphur Creek and Long Valley Creek could be at or over TOC. It is apparent from this analysis, that most of the project area has been heavily impacted and, even using a conservative evaluation approach, can be expected to develop significant problems in the future unless the current trend is reversed. These problems are not expected to be measurably increased, if at all, by the cloud seeding project. This projection is based on the following examination of the CWE mechanisms associated with snowpack augmentation.

CWE's Mechanisms Associated With Snow Augmentation That Cause Cumulative Watershed Effects (CWE)

The cloud seeding I.D. team reviewed the project design, suspension criteria, scientific analysis of other cloud seeding programs and concluded that: 1) adverse watershed effects from the proposed snow augmentation project are expected to be insignificant and undetectable using normal operating procedures; 2) adverse watershed effects should potentially occur only during major rain on snow events;

Figure 11. Current and projected ERA values expressed as percent TOC.



and 3) increases in landsliding and peak flows are the most probable CWE impacts which could be produced by the project during a major rain on snow event.

The following discussion examines the proposed prototype snow augmentation project's influence on various types of mass movement during a major rain on snow event and is largely based on the results of scientific monitoring studies conducted by the Bureau of Reclamation in the San Juan Mountains of Colorado (Caine 1976).

Obviously, environmental conditions differ substantially between the San Juan area and the northern Sierra Nevada. Some dangers always exist in applying the results of a study to another area with different environmental conditions. Unfortunately, no comparable studies have yet been conducted in the Sierra Nevada Mountains. The results from the San Juan study represent the best available scientific information on the effects of snowpack augmentation on geomorphic processes. The very cold temperatures and sparse vegetation of the alpine San Juan Mountains would tend to be more sensitive to changes in precipitation than might occur in the forested Sierra Nevadas (Kattleman 1985).

Snow avalanches do occur within the project area and are capable of moving rock and soil downslope. Snow avalanches in the Sierra Nevadas are typically wet in nature and are usually triggered by rainfall (Kattleman 1985). Rainfall intensity, irrespective of snowpack depth, has been observed to produce snow avalanches (Kattleman 1985). The project's seeding criteria are specifically designed to eliminate

increases in rainfall.

Soil creep is the slow downslope movement of surface material that results from frost heaving and subsequent vertical settling of thawed particles. Additional water can accelerate the creep process. However, snow cover insulates the soil and prevents frost-induced soil creep. Monitoring of snow augmentation in the San Juan Mountains indicates that soil creep was probably not affected by changes in snowpack (Caine 1976).

Solifluction and slumping are the downslope movements of soil as a water-saturated mass. They are common in alpine areas where an impervious layer prevents ground water percolation but can also occur under saturated soil conditions wherever the downslope support for a soil unit has been removed. Road cuts, mining and timber harvest which are abundant in the project area can remove downslope support and result in slope movement. Additional snowmelt and resulting higher soil saturation levels produced through snow augmentation could cause a mass movement to occur where the susceptibility for such an occurrence is high.

Mudflows, the channelized flow of water-saturated soil, differ from solifluction due to their greater speed and confinement to an existing channel. Field measurements in the San Juan Mountains indicate this process is normally initiated by intense rainfall. A major rain on snow event could trigger mudflows in the snow transition zone, especially in some of the project area soils derived from pyroclastic volcanic material. The proposed snow augmentation project could increase the risk of initiating mudflows in the transition zone during a major rain on snow event if the snow augmentation resulted in the presence of snow where none would have been present without cloud seeding. Although it is theoretically possible to produce snow cover through cloud seeding where none would have occurred without cloud seeding, it is, at best, a remote possibility. Such an event offers snow augmentation researchers the best opportunity to quantify the contribution of their cloud seeding effort. However, cloud seeding researchers in a ten year study conducted in the American River Basin were unable to produce such a situation (Dave Reynolds, U.S.B.R., pers. comm.). In deeper snowpack above the transition zone, the depth of snow has no significant effect on the melt rate of snow. Snow melt rates are primarily controlled by rainfall intensity, air temperature, tree cover and wind.

Rockfall, the process through which individual pieces of a cliff become detached and fall vertically, is principally controlled by freeze-thaw action in the Sierra Nevadas and often occurs following road construction and mining. Increased snowmelt associated with cloud seeding could incrementally increase the moisture available for this process.

Landslides and debris avalanches are catastrophic events involving movement of massive quantities of material. Both processes are infrequent events which can produce more sediment in a few seconds than other more continuous geomorphic

process can produce over a century. Increased pore pressure resulting from intense or prolonged rainfall appears to be the main cause of slope failure (Sidle, et al. 1985). Water can trigger landslides in a variety of ways including seepage pressure, reduction of capillary tension, buoyancy, liquefaction, addition of weight, decrease in soil aggregation, and undercutting (Selby 1982). Whenever surface infiltration exceeds the subsurface flow rate (which can occur during periods of prolonged intense rainfall or snowmelt) pore pressure increases. Subsurface flow rate controls the accumulation of soil water during a major rain on snow event. Prolonged periods where infiltration exceeds ground water outflow can result in increased height of the saturated zone and can lead to slope instability.

Modeling of both a 15- and 50-year rain on snow event within the project area indicates that cloud seeding has virtually no impact on peak flows (Appendix C). The small incremental increase in snowpack created through cloud seeding absorbs a small portion of the precipitation early in the rain on snow event. This ability of snow to absorb a small amount of rainfall affects landslides by reducing total flows during rainfall events. The slight moderating effect on total flows serves to reduce undercutting of landslides adjacent to stream channels.

The EIS states that cloud seeding will result in an extended period of snowmelt (estimated at 3 to 7 day maximum). This additional snowmelt, derived from cloud seeding, produces slightly increased ground water levels. These higher ground water levels are projected to dissipate within 4 to 9 days. This projection is based on field studies conducted near Soda Springs in the American River Basin (McDonald 1986, 1987). If a major precipitation event should occur during this 4 to 9 day period that ground water levels are elevated due to cloud seeding, then the increased risk of landsliding could occur as a result of the project.

Researchers have speculated that cloud seeding has the potential to affect mass movement during a major rain on snow event through increased risk of slope movement in disturbed areas, in areas denuded of vegetation (wildfire and clearcuts), and by increasing ground water levels due to the extended snowmelt period. Reduced total flows during rain on snow events, and reduction of the rate of surface infiltration, as well as stimulation of vegetative growth from the proposed project could incrementally reduce the potential for mass movement. Long term scientific monitoring studies conducted in concert with other cloud seeding programs have been unable to detect any incremental effects (either positive or negative) on any mass movement processes. The effects of this cloud seeding program on mass movement are not expected to be any different, especially with the established seeding and suspension criteria.

There is currently no method to quantify how much additional instability could occur as a result of increased snowpack. Since mass movements occur more frequently after heavy or long duration rainfall or runoff events, the effect of small incremental increases in precipitation on slope instability will probably not be measurable during the periods when the project will be operational.

The hydrologic effects of a major rain on snow event in the project area were modeled for a ten square mile area of the upper Greenhorn Creek watershed (Appendix C). The upper Greenhorn Creek watershed was selected to represent a "worst case" situation because 1) it is entirely within the project area; 2) it contains a relatively high percent area in the rain-snow transition zone; 3) CWE projections indicate that this watershed will approach TOC by 1996; and 4) it has relatively high annual precipitation. The upper Greenhorn Creek watershed contains approximately 6,736 acres.

The following discussion summarizes the results of this hydrologic model. During a simulated 15-year rain on snow event, the proposed project (assuming a 10 percent increase in snow pack) has little impact on peak flows. The small incremental increase in snow absorbs a small portion of the rainfall early in the storm and produces a slight (less than one percent) decrease in peak flow. The same storm event was repeated with less initial snowpack in an effort to have all the low elevation snow removed. However, the 10 percent increase in snow produced through cloud seeding again absorbed a slight amount of the precipitation early in the storm, with the peak flow virtually identical. A 50-year rain on snow event was simulated with both the observed and simulated shallow snowpack, both having 10 percent additional snow water equivalent added. Results of these two scenarios indicate no change in peak flow.

These model results confirm what was stated in the EIS. That is, an additional 10 percent increase in snowpack water content will have no impact on flooding or watershed degradation during a rain on snow event.

Mitigation Measures

Suspension criteria employed were designed to mitigate adverse impacts and protect beneficial uses. No additional mitigation measures are recommended. However, the Department of Water Resources and the U.S. Forest Service are both active members of the East Branch North Fork Feather River Coordinated Resources Management (CRM) group and the newly forming Jamison Creek CRM group. The CRM process is designed to facilitate solving cumulative watershed effects problems in multiple ownership and use watersheds. Both agencies will be active participants in any CRM activities conducted within and outside the project area.

Monitoring and Evaluation

During January 1991, the Department of Water Resources proposed and implemented an environmental monitoring program which was designed to document changes in physical water quality parameters, selected nutrient concentrations, sediment production, benthic macroinvertebrate populations, fish populations, and surface erosion rates. Sampling sites selected included the Middle Fork Feather River above and below the project area, Nelson Creek, Long Valley Creek, Jamison Creek and Willow Creek. The approved monitoring plan is

presented in Appendix D. The Department has a program designed to monitor changes in surface erosion and mass movement rates, scheduled to begin data collection in the Middle Fork Feather River during 1992. This program is not associated with the cloud seeding program, but information derived from this program will be very useful in tracking changes in watershed conditions. The cloud seeding program could be modified based on the results of these studies.

ISSUE 3. The effects of the project on sensitive, threatened and endangered wildlife species need to be better addressed. (Appeal Item 6c).

DIRECTION

Supplement the EIS with a biological evaluation for sensitive, threatened and endangered wildlife species in the project area as per FSM 2672.4. This evaluation will determine if snowpack augmentation will adversely effect the sensitive, threatened and endangered wildlife species or their habitat.

DISCUSSION

This biological assessment examines the potential for adverse effects on endangered, threatened, proposed and sensitive wildlife species and their habitats resulting from the five year prototype cloud seeding program. The "listed" species of known or suspected occurrence within the project area are presented in Table 12, which was developed in consultation with Plumas National Forest wildlife personnel.

Table 12. "Listed" wildlife species of known or suspected occurrence within the cloud seeding project area (USFWS = F, State = S, USFS =FS).

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
bald eagle	<u>Haliaeetus leucocephalus</u>	S+F-Endangered
California spotted owl	<u>Strix occidentalis</u>	FS-Sensitive
American peregrine falcon	<u>Falco peregrinus anatum</u>	S+F-Endangered
wolverine	<u>Gulo gulo</u>	S-Threatened; F-Candidate
Sierra Nevada red fox	<u>Vulpes vulpes necator</u>	S-Threatened; F-Candidate
willow flycatcher	<u>Empidonax traillii</u>	FS-Sensitive
Northern goshawk	<u>Accipiter gentilis</u>	FS-Sensitive
golden eagle	<u>Aquila chrysaetos</u>	F-Protected
pine martin	<u>Martes americana</u>	FS-Sensitive

All of the species identified in Table 12 may occur within the project area except the Sierra Nevada red fox. The following discussion briefly summarizes the known distribution and occurrence of "listed" species within the project area. Where appropriate, discussion of potential habitat is included.

No nesting bald eagles are known to occur within the project area. However, two

active (i.e., recent reproductive behavior) nests are located at Lake Davis within 5 miles of the project boundary. Three known or suspected winter roost sites occur within the project boundary. All three are located on either the north or east boundaries of the project area. The Middle Fork Feather River, which bisects the project area, is heavily used by wintering bald eagles. Mid-winter bald eagle count information indicates that the Middle Fork Feather River is used for loafing, foraging and as a travel corridor.

Approximately 15 pairs of spotted owls are known to nest within the project area. Two propane dispensing sites are located within active spotted owl territories (propane dispenser No. 2 and No. 5). One precipitation gauging station is also located within an active spotted owl territory (precipitation gauge No. 10). This spotted owl territory is closed to entry from March 1 through August 31. If alternative sites for propane dispensers and precipitation gauges cannot be selected, then required maintenance and spring removal of these facilities may be affected. Both spotted owls and goshawks winter within the project area and may move downslope during periods of inclement weather.

No known peregrine falcon nest sites occur within the project area. Currently unoccupied, marginally suitable cliff nesting sites occur throughout the project area. Sporadic historical sightings of migrating or wintering peregrine falcons have occurred throughout the project area.

At least three wolverine sightings have occurred in the Lakes Basin Area, which is located adjacent to the most southeast propane dispenser site. The most recent sighting was in 1988. Wolverines have large home ranges and are reported to use timbered ridgetops as travel corridors (Ingram 1973). Wolverines present in the Lakes Basin Area could be expected to utilize the high elevation ridge where the propane dispensers are located.

No historical sightings of Sierra Nevada red fox have been recorded within the project area. Suitable habitat for this species may exist at McRae Meadows and along the Middle Fork Feather River between Portola and Beckwourth.

Willow flycatchers have been observed in the project area, between Portola and Beckwourth. Suitable habitat may exist at McRae Meadows, along the Feather River near Sloat, near Gray Eagle, and possibly along the tributaries to Lake Davis. The Sloat habitat is probably marginal. The tributaries to Lake Davis are approximately 3 to 4 miles north of the project boundary.

At least 12 active Goshawk nest territories occur within the project area. The majority of these territories are in close proximity to or overlap spotted owl territories. Propane dispenser and precipitation gauging station locations are not located in any known goshawk territories.

Three golden eagle nest territories (two active and one abandoned) occur within the

project area. Two of these sites are located along the Middle Fork Feather River between Eureka Creek and Smith Creek. Both nests are located on north-facing cliffs adjacent to the river. The third golden eagle nest site is located at the northeast edge of the project area near Beckwourth.

Marten sightings have occurred in the Gibraltar Peak Area, Lakes Basin Area, Haskell Peak Area and in the Sulphur Creek drainage within the project area. Martin sightings are fairly common in the area proposed for propane dispenser sites.

Due to the lack of field reconnaissance, we must assume that all the "listed" species in Table 12 occur within the project area. Suitable potential (although unsurveyed) habitat exists within the project area to support Sierra Nevada red fox, though this species is not known to occur in the area.

Environmental Effects of Cloud Seeding

To evaluate the project influence on listed species, it is necessary to identify the project's environmental effects, including the effects of required maintenance and monitoring activities. The EIS was used to identify the projects potential environmental effects. Those potential environmental effects of the project identified from information in the EIS include increased risk of avalanche, increased snow depth, increased precipitation amount and intensity, increased soil moisture, increased risk of collision (helicopter and propane dispensing towers), increased risk of human disturbance, delayed snow melt, impact to species management activities and cumulative effect.

Several other potential environmental effects were examined and dismissed based on information provided in the EIS. These effects include propane leaks, fire and out of target area effects. Liquid propane vaporizes readily. Due to the low probability of leaks and the ridge top locations (which serve to disperse the propane gas) it is unlikely that even if a leak should occur that a listed species in the immediate area would be injured. Likewise the potential for a damaging fire is quite low considering the season of operation and natural clearing near the rock ridgeline where dispensers will be installed. Out of area effects, if any, are anticipated to be below detection limits since ice crystals formed from propane release are expected to grow rapidly and fall as snow primarily within the target area.

Those environmental effects identified in the EIS which could potentially influence listed species were used as evaluation criteria. The effect of each of these evaluation criteria on each of the listed species' food, water, cover, reproduction and special habitat needs was assessed.

Avalanche - The EIS states that project operations may have a contributory effect on snowpack conditions which lead to avalanche conditions. U. S. Forest Service records indicate that none of the "listed" avian species are known to nest in areas prone to avalanche. Wolverine, marten and Sierra Nevada red fox all could and

undoubtedly do occur in avalanche prone areas. Accidental death of these forbearers due to avalanche is possible but judged to be highly unlikely. The Department of Water Resources will suspend seeding activities when critical avalanche hazards are judged to exist. Suspension criteria are identified in the EIS.

Increased Snowpack - The goal of this cloud seeding program is to increase water yields through increased snowpack. Snowpack depths above 5,900 feet are expected to be greater than they would be without the project by approximately 10 percent. During the winter, food sources for raptors and furbearers are reduced due to snow cover and mammalian hibernation. Due to the mobility of the listed species and the steepness of the terrain, the incremental increase in snow depth may result in a temporary short downslope movement by some of the listed species. This is the normal response of these species to increased snowpack. The cloud seeding program will primarily operate in years of normal or below normal precipitation. Snow depths produced should be well within the normal range of depths to which these species are adapted.

Bald eagles have been documented to migrate further south during colder winters (Steenhof 1978). A 10 percent increase in snowpack should not significantly alter species distribution or adversely impact any of the listed species.

Heavy snowfall can damage or destroy eagle tree nests. The only eagle tree nest in the project area is located north of Beckwourth. This golden eagle nest is located below the 5,500 foot snowline and in an area which normally receives 15 to 20 inches of precipitation annually. Most of the limited precipitation at this site is in the form of rain, thus snow damage seems unlikely. The project will not decrease the elevation at which snow falls nor will it effect daily temperature regimes.

Increased Precipitation Amounts and Intensity - The EIS indicates that cloud seeding activities will increase precipitation by an average of 0.08 inches above 4,500 feet during an eight hour storm event. Assuming a reasonably even distribution of precipitation, these levels of increased precipitation amount and intensity should pose no adverse effects to any "listed" species.

Increased Soil Moisture - The EIS projects that a full season of cloud seeding will produce an extra 2 inches of precipitation. Approximately 2/3 of this increase will leave the area as runoff while the remaining 1/3 will infiltrate into the soil column and be lost through evapotranspiration. The extra 0.6 to 0.7 inches of precipitation may slightly increase soil moisture. This slight increase will probably not be measurable. Although an increase in soil moisture could largely be beneficial to listed species (during years of normal or below normal rainfall when the project will be operating), the small amount of increase will probably not significantly benefit listed species. The EIS states that the project will temporarily increase ground water levels, and increase the period of stream and spring flow. These increases could dampen the effects of drought in below rainfall years. Increased streamflow would benefit willow flycatchers, spotted owls, goshawks, bald eagles, and Sierra Nevada

red fox whose use of riparian habitats is disproportionately higher than its occurrence.

Collision - Both the propane dispensing towers and the helicopter used to install and remove them are subject to collision by raptors. Nesting raptors, particularly eagles, goshawks, osprey and falcons, defend their nest territories from other large avian species. These raptors incorrectly identify helicopters as large avian threats and respond by attacking. The California Department of Forestry has adopted guidelines for helicopter operations around known peregrine nest sites. The fall installation is outside the critical nesting season of listed raptors. Helicopter crews will be advised of the guidelines for operating near raptor nests, but will avoid all known nest sites. The Department will check all flight paths, particularly near suitable cliff sites prior to spring removal of the propane dispensers. Helicopter flights will be coordinated to avoid areas of human settlement and any new raptor nest sites discovered.

Collisions between raptors and propane dispenser towers during inclement weather is possible, but unlikely. These towers are 13 feet in height and fairly narrow (8 to 10 inches maximum). Due to their placement on rocky ridge tops, it is likely that these towers would be attractive raptor perch sites. Lack of cover and turbulent conditions probably preclude their use during periods of cloud seeding operations. Raptors perched on the towers during cloud seeding operations would not be asphyxiated since the propane vaporizes instantly. The chemical reaction during vaporization produces extremely cold temperatures (-100 F), which should further discourage raptor use during cloud seeding operations. Each site will be inspected annually for signs of raptor-tower collision. Results of this survey will be provided to the Plumas National Forest.

Increased Human Disturbance - The project should induce minimal human disturbance into the area. Approximately one-half day will be required for fall installation of all sites. An equivalent amount of time will be required for spring removal of the propane dispensing system. Unplanned visits (between installation and removal) will occur only in the event of equipment failure. Access for equipment repair will be by snowmobile, snowcat, or helicopter. The adverse effects of intensive snowmobile use on wildlife is well documented (Baldwin 1968, Doan 1970, Newman and Merriam 1972). Snowmobile activity around bald eagle winter roost sites is a serious disturbance factor (Ingram 1965) and can adversely impact wolverines (Ingram 1973). All access between March 1 and August 31 will be coordinated with U. S. Forest Service wildlife personnel to avoid known raptor nest sites. Spotted owls, golden eagles, peregrine falcons and bald eagles begin to nest on the Plumas National Forest around March 1. Entry will be very minor, limited only to emergency repairs, thus eliminating or greatly reducing effects to wildlife. Operations and maintenance personnel will be cautioned on the dangers to wildlife from snowmobile harassment.

Delayed Snowmelt - The EIS projects that the period of snowmelt will be extended

an average of 1 to 3 days in the project area. Snowmelt may, however, be extended for a slightly longer period in sheltered micro-habitats. Steep north-facing slopes and areas of dense coniferous cover are examples of sheltered micro-habitats. They are also the micro-habitats selected by spotted owls and goshawks for nesting. Goshawks do not begin nesting activities until approximately May 1, but spotted owls become active around March 1. The EIS states that the cloud seeding program will operate only in years of normal and below normal precipitation. The period of snowmelt during years of average or less precipitation will be well within the time range to which listed species in the area are adapted. The short period of delayed snowmelt, even in sheltered micro-habitats, should not adversely effect any listed species.

Two golden eagle nests are located on north-facing cliffs above the Middle Fork Feather River. They are both located below the 5,000 foot snowline. Delayed snowmelt should not influence either nest site.

Impacts to Species Management Activities - Species management activities consist of active search for individuals of listed species, monitoring reproduction of known nest or den sites and determining habitat use of listed species.

None of the physical environmental effects of the proposed cloud seeding program should impair listed species management activities on the Plumas National Forest (Tom Ratcliff, Wildlife Biologist, Plumas National Forest, pers. comm.).

Cumulative Impacts - Cumulative impacts are by definition impacts which are singularly insignificant but may cumulatively adversely impact a species or its habitat. Discussion with Plumas National Forest wildlife personnel identified no cumulative impacts from this project or between this project and other activities currently underway in the project area. No cumulative impacts to "listed" wildlife species have been identified related to this cloud seeding program.

CONCLUSIONS

The potential impacts on listed species from the environmental effects of the cloud seeding program should be negligible. The cloud seeding program will not result in "take" of any listed species. No loss or adverse modification to habitats has been identified. Conversely, the cloud seeding program will not significantly benefit any listed species or their habitats.

Numerous public comments were received on the Draft EIS concerning the prototype project impacts on listed wildlife species. The public perception that the project will adversely impact listed species will not change unless populations of listed species are monitored and their status made public. The Department of Water Resources will assist the U. S. Forest Service in monitoring listed wildlife populations in the project area. Potential habitat will be identified and surveyed with special emphasis on the areas adjacent to propane dispensers and precipitation

gauges where cloud seeding activities have the greatest potential influence on new or previously unknown individuals of "listed" species.

Biological Assessment Recommendations

- 1) Consult with U. S. Forest Service biologists concerning entry into spotted owl management areas prior to removing propane dispensers. If unacceptable effects due to entry are likely, the dispensers would be left during the critical period from March 1 through August 31. An alternative, if effects from entry are considered significant, is to eliminate placement of dispensers two and five.
- 2) Survey helicopter flight path annually for new or previously unknown nesting raptors (particularly eagles, osprey and falcons). Modify flight paths as necessary to avoid known raptor nest sites. Advise helicopter crews on how to avoid raptor/helicopter interactions.
- 3) Monitor annually for wildlife mortality around propane dispenser sites.
- 4) Advise the Department of Water Resources Operation and Maintenance personnel of the impact of snowmobile activities on wildlife and caution against intentional and unintentional harassment.
- 5) Contact U. S. Forest Service wildlife personnel before any entry into any of the propane dispensing sites or precipitation gauging stations within the period from March 1 through August 31. This contact will eliminate any unintentional entry into newly discovered "listed" species habitats.
- 6) Coordinate environmental monitoring activities (i.e. fisheries, erosion, sedimentation, water quality and rare plant studies) with U. S. Forest Service wildlife personnel to avoid entry into areas where wildlife closures are in effect.
- 7) Coordinate population monitoring of "listed" species with U. S. Forest Service wildlife personnel.

U. S. Forest Service Assessment Evaluation

Tom Ratcliff, East Zone Wildlife Biologist for the Plumas National Forest has reviewed the Biological Assessment, the Joint EIR/EIS for the Prototype Project to Augment Snowpack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties - November, 1990, and the Draft Supplement to the EIS. He concludes that in accordance with current Region 5 direction, this Biological Evaluation documents an assessment of the proposed Snowpack Augmentation project proposed by the California Department of Water Resources in cooperation with the Plumas National Forest. Direction for this Evaluation is provided in FSM 2670 and current R-5 policy letters.

The Biological Assessment discusses the sensitive species likely to be in the project area. The list is thorough and complete. Further, the Biological Assessment points out that snowpack augmentation will only occur in those years when precipitation is at average or below. The anticipated effect of augmentation would be in a range of less than a 10 percent increase in snowpack. This increase in average depths is certainly well within range of natural fluctuations and is well below such recent peak snowpack years as 1982 and 1983. Populations of animals discussed on National Forest lands have evolved with fluctuations much greater than the 10 percent of variance proposed herein.

In reviewing the recommendations presented by the Department of Water Resources in their Biological Assessment, Mr. Ratcliff found adequate protection measures for sensitive species proposed. Provision for monitoring has been made. Provision for avoidance of interruption of critical nesting and breeding seasons has been made.

The EIR/EIS documents the surveys for sensitive plants that were conducted in 1988 (pages 56 to 57). None of the dispenser sites proposed for this project contain sensitive plants. No ground disturbance to sensitive plant locations will occur as a result of the project. Again, the minor deviation in moisture regime is well within the tolerance range of site adapted plants.

Mr. Ratcliff has determined that this project with accompanying management recommendations will have no effect on any sensitive species, plant or animal, within the project area. Further, this project will have no effect on the Plumas N.F. Spotted Owl viability network.

The Biological Assessment is incorporated into this Biological Evaluation and all recommendations. Mr. Ratcliff states that the project should be allowed to proceed as planned upon compliance with other regulations and permit requirements as outlined by the Forest Supervisor.

ISSUE 4. A further analysis needs to be made on the potential effects of flooding on small streams. (Appeal Item 7).

DIRECTION

Since flooding problems are a concern, the suspension criteria needs to be validated. Supplement the EIS by determining the recurrence intervals for a storm that produces 4 inches of rain at Quincy, 5 inches of rain at La Porte, and the 60,000 cfs inflow into Lake Oroville. These data will tell if these rainfall and runoff events are extreme or common. If they are a common occurrence, then the flooding concern should be alleviated. If these events are extreme events, then the Forest Supervisor should evaluate the appropriateness of the suspension criteria.

DISCUSSION

It should first be mentioned that certain meteorological criteria have to be met before seeding will be initiated. Of most importance is the temperature both at the propane dispenser sites and at the 5,000 foot elevation zone. Seeding will not be conducted if the temperature at the dispensers sites is above -2 C or rain is falling at the 5,000 foot elevation. This criteria alone will preclude seeding during the warm storm events which historically produce the largest floods. In addition to this, however, suspension criteria have been established to further avoid seeding during potential flood situations.

The EIR/EIS provided a list of suspension criteria that are invoked when heavy precipitation periods and subsequent high streamflow events are expected. Specifically the criteria state that seeding would be suspended when precipitation (rain or snow water equivalent) of 4 inches in 24 hours, 5 in 48 hours or 6 inches in 72 hours at Quincy, CA is predicted or observed (via hourly telemetered data) to occur. Quantitative precipitation forecasts for Quincy are based on a numerical model developed to predict precipitation over mountain barriers and calibrated using empirical data from the Feather River watershed (Rhea 1986). If Quincy is unavailable the gauge at LaPorte would be used. The criteria for LaPorte are 5 inches in 24 hours, 6 inches in 48 hours or 7 inches in 72 hours. In addition to these criteria, predicted or observed inflow to Oroville Reservoir exceeding 60,000 cfs would also suspend project operations. These criteria were chosen based on long term historical records indicating that if seeding were suspended using these conservative threshold values, contributions to potential flooding situations via seeding would be all but eliminated.

Figure 12 is a plot showing the return interval of various 24 hour precipitation amounts at Quincy based on the period of record 1898 to 1982 (period of record available from the National Climatic Data Center). The graph shows that the 4 inches in 24 hours has a return interval of about 2.5 years. Stated another way, there is a 40 percent chance that one 24 hour period having 4 inches of precipitation will occur in a given year. Figure 13 shows the same diagram for LaPorte. Although the period of record is much shorter (1959 to 1976) the return interval for 5 inches in 24 hours is about every two years, much like Quincy. Figure 14 is a similar diagram for peak flows for the Feather River at Oroville. Here the period of record is 1881 to 1985. Both the return interval and probability of exceeding a given peak flow in a given year are shown. The 60,000 cfs peak flow has a return interval of one event every two years or a 50-50 chance of occurring in any given year. It can be concluded that the threshold levels chosen for the suspension criteria are not rare events and would suspend seeding well before damaging flooding occurs.

A similar snowpack augmentation project run by the U. S. Bureau of Reclamation (Sierra Cooperative Pilot Project) on the American River watershed for over ten years (1976 to 1987) utilized very similar suspension criteria. In every serious precipitation or high streamflow event that occurred, seeding was suspended often

Figure 12. Return interval for precipitation within a 24 hour period at Quincy, Cal.

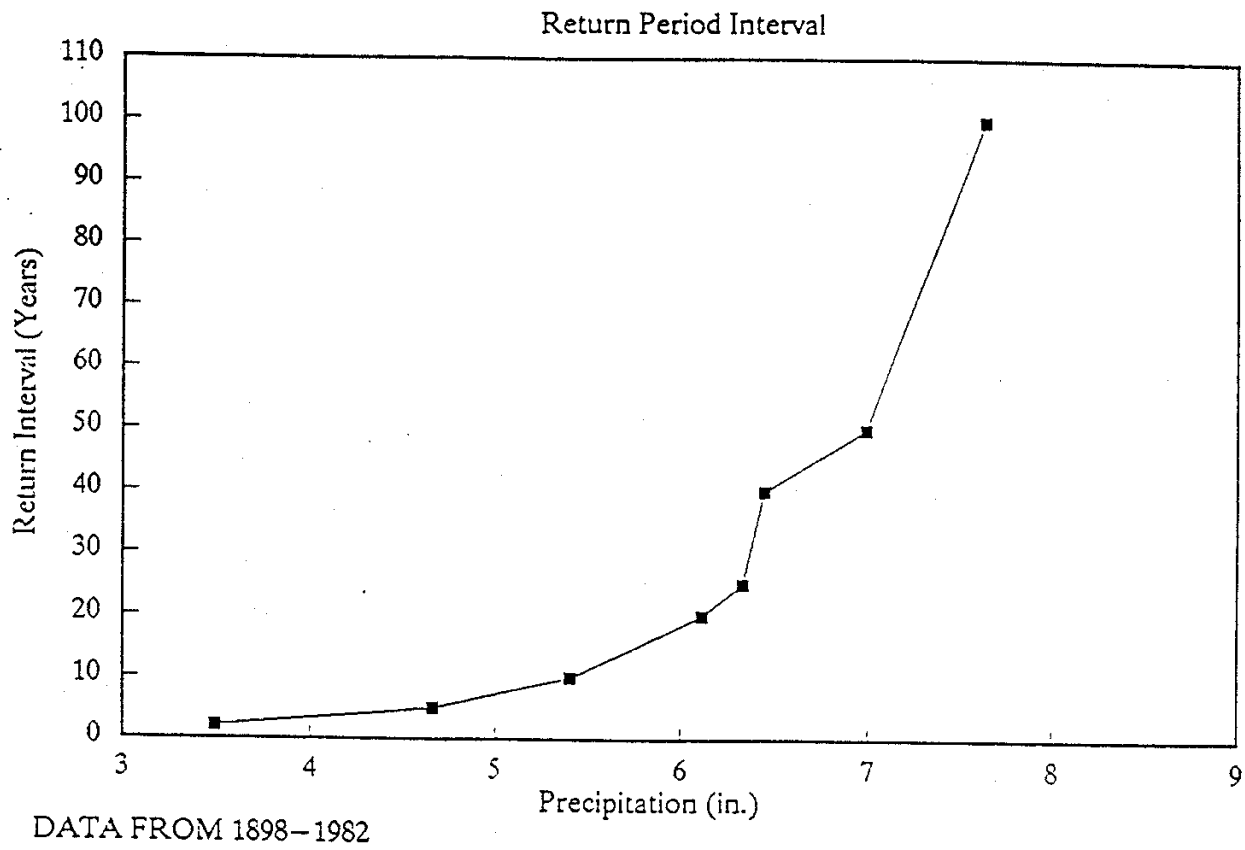


Figure 13. Return interval for precipitation within a 24 hour period at LaPorte, Cal.

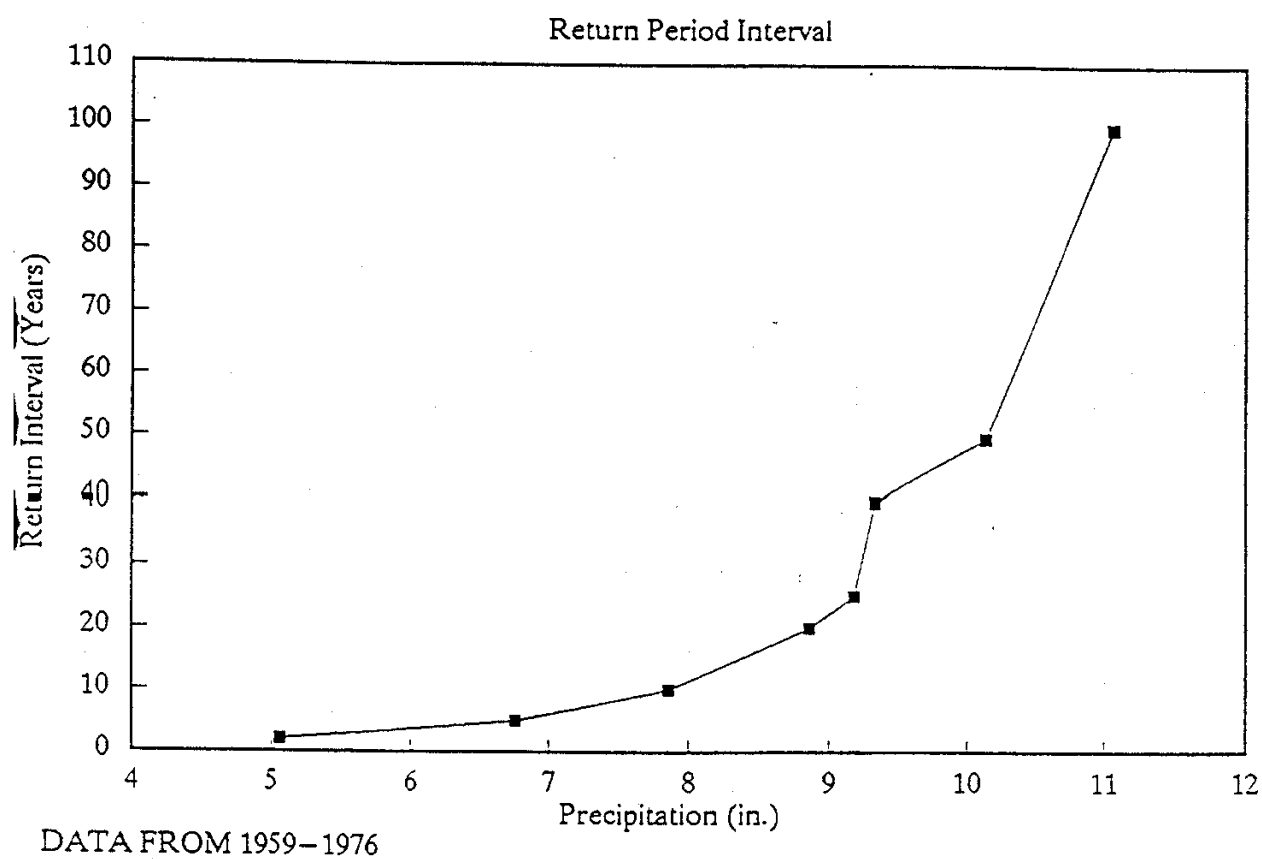
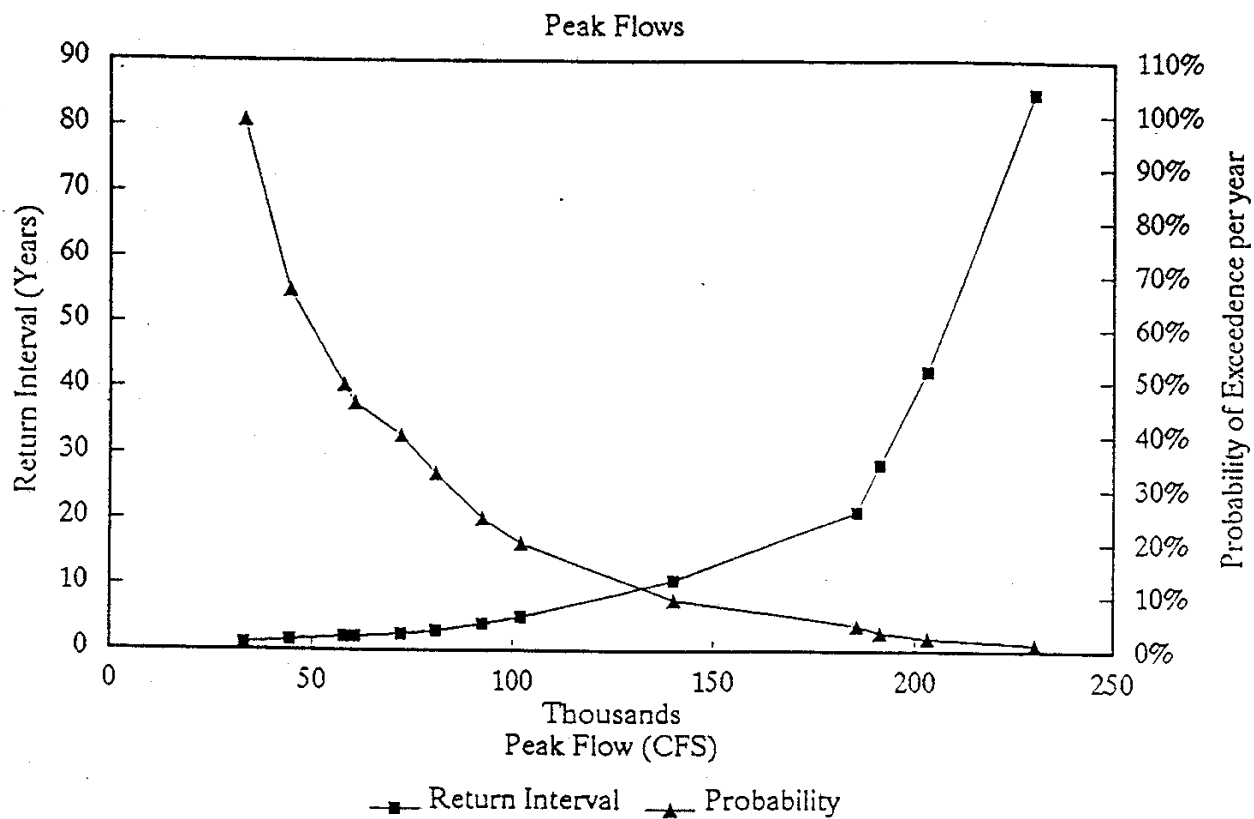


Figure 14. Return intervals for peak flows in the Feather River at Oroville, Cal.



Data from 1881-1985

several days before flooding became a problem. It is anticipated that this five year project will be just as successful in avoiding seeding during potentially hazardous situations.

ISSUE 5. Identify if there are any municipal supply watersheds within the project area, and, if so, the effects of the project on water quality in these watersheds. (Appeal Item 8a).

DIRECTION

Since the EIS does not mention domestic water uses, supplement the EIS by reviewing the Forest Land Management Plan to determine if any municipal supply watersheds are in the project area. If there are municipal supply watersheds present, then discuss how this project meets the Forest Plan standards and guidelines.

DISCUSSION

Seventeen domestic water supply systems (i.e., greater than five hookups) occur within the cloud seeding project area (Table 13). These systems supply water for domestic use to approximately 2,700 customers and range in size from 5 to 1,800 hookups.

Sixty-four percent of these water systems rely exclusively upon ground water sources, including Western Pacific Railroad, Grizzly Lake Resort Improvement District, Middle Fork Trailer Park, Plumas-Eureka State Park, Cromberg Springs Associates, Golden Coach Trailer Park, Feather River Lumber Company and Sloate Water System. Twenty-four percent use both surface and ground water sources. Water purveyors using these hybrid systems include City of Portola, Plumas-Eureka Estates, Layman Bar Summer Home Tract, and Spring Garden. Twelve percent of the systems use only surface water sources, including Graeagle Water Company and Blairsden Water Users Association.

This project is expected to meet Plumas National Forest Plan guidelines, which are to "keep water quality at a level that will allow a safe and satisfactory supply when given reasonable treatment by the purveyor."

The EIS/EIR projected no impact to water quality, assuming no significant increase in erosion rates. The EIS/EIR further projects that enhanced runoff will not significantly increase erosion within the project watershed. The quality of water is not expected to be degraded (see CWE analysis). One of the principal environmental advantages of using propane for cloud seeding purposes is that the precipitation formed from propane contains no contaminants (unlike seeding with silver iodide). The pilot project will not contribute contaminants to the watershed. Although input of chemical constituents will not increase over natural levels, chemical weathering may increase total dissolved solids output. Increased quantity of water leaving the watershed, however, should dilute the total dissolved levels to

concentrations at or below preproject levels.

The cloud seeding pilot program is not expected to alter water quality from existing safe levels. Summer water supplies may be increased slightly due to higher ground water levels.

ISSUE 6. Assure that the California Department of Fish and Game, and the U.S. Fish and Wildlife Service are consulted on this project. (Appeal Item 6b).

DIRECTION

Since it is not clear what documents were received by the Department of Water Resources, supplement the EIS with 1) the procedure that the Department of Water Resources used in consulting with the California Department of Fish and Game and U. S. Fish and Wildlife Service, and 2) any written responses obtained from these agencies.

DISCUSSION

Both the Department of Fish and Game and U. S. Fish and Wildlife Service received copies of the draft EIS/EIR. Neither agency chose to comment on any portion of the draft EIS/EIR.

Specialists from both agencies were contacted during the development of the Biological Assessment to provide information or opinions on species specific impacts associated with the proposed cloud seeding program. No written communication from either agency has been received.

PUBLIC COMMENTS TO DRAFT SUPPLEMENT AND RESPONSES

Comments on the Draft Supplement to the Environmental Impact Statement for the Prototype Project to Augment Snow Pack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties were received from the U. S. Geological Survey, the Plumas-Sierra Rural Electric Cooperative, the U. S. Office of Environmental Affairs, the U. S. Environmental Protection Agency, the California Sportfishing Protection Alliance, the Plumas Ski Club, Ms. Beulah Bozzo, Mr. Richard Gardner, and the California Department of Parks and Recreation.

Comments and responses to comments follow.



United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA 22092

In Reply Refer To:
WGS-Mail Stop 423
ER 91/734

SEP 23 1991

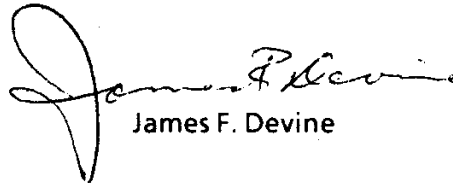
Memorandum

To: Acting Forest Supervisor, Plumas National Forest, Quincy, California
From: Assistant Director for Engineering Geology
Subject: Prototype Cloud Seeding Project, Supplement to Draft EIS, Lakes Basin Area, Plumas and Tahoe National Forests, California

We have reviewed the subject document as requested in your memorandum of August 8, 1991. Our comments are as follows:

The potential for flooding caused by increased runoff should be addressed in the Draft Supplement.

The potential contaminate effect of the seed particulate should be examined. If, for example, silver iodide (AgI) is used, the anticipated concentration of AgI in meltwater runoff and in the snowpack should be stated.


James F. Devine

Copy to: District Chief, California

SEP 26 1991

RESPONSE TO COMMENTS FROM THE U. S. GEOLOGICAL SURVEY:

Potential for Flooding - The Regional Forester requested supplementary information for evaluation of the suspension criteria incorporated into the project to alleviate flooding problems. The supplementary information was presented on page 44 to 49 of the draft supplement. The information showed that the criteria used to suspend cloud seeding were not uncommon events, and would require suspension of cloud seeding well before damaging flooding occurred.

Further, the Joint Environmental Impact Statement - Environmental Impact Report for the Prototype Project to Augment Snowpack by Cloudseeding Using Ground Based Dispensers in Plumas and Sierra Counties (September 1990) discussed suspension criteria and the potential for flooding caused by increased runoff on pages 25 to 27, 48 to 49, and 62. As discussed in the Joint EIS/EIR and the Supplement, the suspension criteria would suspend cloud seeding under quite conservative conditions to minimize the risk of flooding.

The project is designed to operate only in years of average or below average precipitation. Although about 32,000 acre-feet of precipitation may be augmented by the project during near normal years, due to evapotranspiration only about 22,400 acre-feet would actually add to total runoff downstream from the enhancement area. This potential increase in runoff would increase the average annual discharge of the Middle Fork at the gage below Sloat by about 5 percent.

Also as discussed in the Joint EIS/EIR, the rate of meltwater production is essentially independent of the amount of snow on the ground. By increasing the snowpack, the period of snowmelt would be extended, but the snowmelt hydrograph would not be shifted. Snowpack also has a moderating influence on streamflow by delaying rain runoff. Increased snowpack in average to below average years is not expected to result in a material increase in peaks of major snowmelt floods.

Seeding Agent Contamination - The Joint EIS/EIR discussed potential environmental contamination from cloud seeding on pages 27 and 42 to 46. Both silver iodide and propane were considered as seeding agents. Silver iodide was not selected due to the possibility of residual nucleation which could mask the testing of the effectiveness of cloud seeding. Propane will be used as the seeding agent for this project.

Propane does not act as the nuclei for ice crystal formation, but rather when vaporized acts as a freezing agent which causes water vapor to condense and form ice crystals. The ice crystals grow to snowflakes if additional supercooled liquid water is available. The propane vapor will dissipate rapidly in the atmosphere due to release during intense storm conditions.



**Plumas-Sierra
Rural Electric Cooperative**

73233 Highway 70
(Highway 70, 3 miles West of Portola)
P.O. Box 2000
Portola, CA 96122-2000

Phone (916) 832-4261
FAX (916) 832-5761

September 30, 1991

Mr. Court Bennett
U.S. Forest Service
PO Box 11500
Quincy, Ca 95971

Dear Court:

I have reviewed the project about the proposed cloud seeding project. I would again like to raise my concerns about this project. The increase of either wet or dry snow load to the area presents problems to increasing the damage that will happen to Plumas-Sierra Rural Electric power lines. I do not feel it is the responsibility of my consumers to pay for the increase of costs due to the increase of snow fall. I feel if this project does go through then Plumas-Sierra should be compensated for this increase of costs. I am more than willing to discuss this further with you.

Thank you for listening to my concerns.

Very truly yours,

Bernard W. Pfile
General Manager

RESPONSE TO COMMENTS FROM THE PLUMAS-SIERRA RURAL ELECTRIC COOPERATIVE:

The cloud seeding project is designed to operate only in years of average to below average precipitation. Snowfall produced by cloud seeding would be well within the natural variability of precipitation for the area, and thus not increase maintenance costs for electrical facilities. In addition, suspension criteria would prevent cloud seeding when heavy precipitation periods are predicted, since such storms may cause damage to facilities such as power lines. Snowfall produced by the project is not expected to increase damage to electric power lines.



IN REPLY REFER TO:

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Affairs
600 Harrison Street, Suite 515
San Francisco, California 94107-1376



September 30, 1991

ER91/783

Mr. Court Bennett
U.S. Forest Service
P.O. Box 11500
Quincy, CA 95971

Dear Mr. Bennett,

The Department of the Interior has reviewed the draft supplement to the Environmental Impact Statement for the prototype project to augment snow pack by cloud seeding using ground based dispensers in the Plumas National Forest, Plumas and Sierra counties, California.

The Department is concerned about the potential for long-term, cumulative adverse impacts of stream sedimentation in this highly erodible watershed resulting from altered runoff and streamflow patterns. Although monitoring programs are proposed for determining changes in rates of erosion, stream sedimentation, and aquatic habitat, it appears likely that highly variable natural runoff conditions will mask project impacts.

To offset these subtle impacts, we suggest that language be included in the EIS indicating that the project sponsors and beneficiaries will provide funding assistance for the Coordinated Resource Management Program in the Feather River drainage.

We appreciate the opportunity to comment.

Sincerely,


Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEA (w/orig. incoming)
Regional Director, Fish and Wildlife Service
State Director, Bureau of Land Management

RESPONSE TO COMMENTS FROM THE U. S. OFFICE OF ENVIRONMENTAL AFFAIRS:

Hydrologic modelling studies, discussed in the Draft Supplement on pages 83 to 90 and in the Final Supplement on pages 143 to 150, indicate that the 10 percent increase in snowpack water content expected from seeding of winter storms has little impact on peak flows, and may actually decrease peak flows slightly due to absorption of rainfall. The rate of snowmelt during the spring would not be greater, though the period of snowmelt would be extended. Since runoff and streamflow peaks are not increased, watershed degradation from a 10 percent increase in snowpack due to cloud seeding would not likely be detectable considering the highly variable natural runoff patterns.

As discussed on pages 93 and 94 of the Draft Supplement and pages 153 to 154 of the Final Supplement, the cloud seeding project has participation in Coordinated Resource Management Programs in the Feather River drainage as part of the monitoring program. Participation in CRM programs will assist in identifying and correcting water quality, biological, and erosional problems in the watershed.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, Ca. 94105

07 OCT 1991

Court Bennett
U. S. Forest Service
P. O. Box 11500
Quincy, California 95971

Re: Draft Supplement to the Environmental Impact Statement
for the Prototype Project to Augment Snow Pack by
Cloud Seeding Using Ground Based Dispensers in
Plumas and Sierra Counties

Dear Mr. Bennett:

The U. S. Environmental Protection Agency (EPA) has reviewed the Draft Supplement to the Environmental Impact Statement for the Prototype Project to Augment Snow Pack (hereinafter, Draft Supplement). We provide our comments pursuant to the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act and the Council on Environmental Quality's Regulations for Implementing NEPA.

The U. S. Forest Service (USFS) - Plumas National Forest and the Department of Water Resources (DWR) jointly prepared a Draft Environmental Impact Statement (DEIS) in June, 1990 which proposed a five year program for enhancing water yield by augmenting snow pack in Sierra and Plumas Counties. The proposed project would seed approximately 165,000 acres of the Upper Feather River Basin using a network of ground-based, remotely operated liquid propane dispensers. Project sponsors anticipate that cloud seeding will augment snowfall by an average of 5% or less, yielding an addition of about 32,000 acre-feet of water to the project watershed.

EPA provided comments on the DEIS on June 28, 1990. The USFS issued its Final EIS in September, 1990, and its Record of Decision (ROD) on September 12, 1990. The California Sportfishing Protection Alliance and the Friends of Plumas Wilderness appealed the Forest Supervisor's decision to the Forest Service's Pacific Southwest Regional Forester who affirmed all but six issues raised by the appellants. The objective of this Draft Supplement to the EIS is to address the issues not affirmed by the Regional Forester. They are, as follows:

1. The EIS did not adequately describe the existing known data that can relate to the watershed condition and

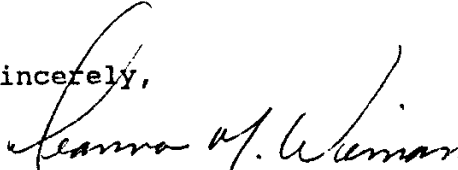
fisheries habitat of the third order streams mentioned in the California Sportfishing Protection Alliance and the Friends of the Plumas Wilderness appeal.

2. There was not an adequate description of the cumulative effects and the factors used in the cumulative watershed effects analysis on the third order drainages mentioned in the appeal.
3. The effects of the project on sensitive, threatened and endangered wildlife species need to be addressed better.
4. A further analysis needs to be made on the potential effect of flooding on small streams.
5. Identify any municipal supply watersheds within the project area and describe the effects on water quality in these watersheds resulting from the project.
6. Assure that the California Department of Fish and Game and the U. S. Fish & Wildlife Service are consulted on this project.

We have classified this Draft Supplement as Category EC-2 (See enclosed "Summary of Rating Definitions and Follow-up Action". Our rating reflects the need for additional information in the Final Supplement regarding the cumulative watershed effects analysis and other phenomena which may exacerbate cumulative watershed effects. Our specific comments are enclosed.

We appreciate the opportunity to review and provide comments on the Draft Supplement. Please send two copies of the Final Supplement to this office at the same time it is officially with our Washington, DC office. If you have any questions, please feel free to contact me at (415) 744-1015, or have your staff contact Kathryn Mazaika of the Office of Federal Activities at (415) 744-1575.

Sincerely,


Deanna M. Wieman, Director
Office of External Affairs

Enclosure: 5 pages

cc: Jerry Boles, Project Manager, Department of Water Resources
John Chatoian, US Forest Service, Region V

Introduction

The primary enhancement area, as noted in the Draft Supplement, is almost totally within the Middle Fork of the Feather River drainage. The impact area includes the Middle Fork of the Feather River as it traverses the area from Portola on the east to below Sloat on the west. The major streams discharging to the Middle Fork in the stretch of the river are all of catchment areas of the Willow, Grazier, Gray Eagle, Jamison, Long Valley and Poplar Creeks. Three other streams will be partially affected; the lower ends of Big Grizzly and Sulphur Creeks and the upper catchment of Nelson Creek lie partially in the alignment of the dispensers.

Water Quality

Cumulative Watershed Effects (CWE)

The Forest Service Handbook 2509.22 indicates at Chapter 22.12 that, "modeling CWE is not a precise science; it is a young and developing field. Development of a quantitative, statistically valid, technical model for assessing CWE is not now possible because ecological and geomorphic systems are complex and vary from one watershed to another." As the result of recent studies, the handbook recommends consideration of at least the beneficial uses, the cause and effect relationships of human activities and climatic events on beneficial uses of water in addition to other variables such as hillslope and stream channel morphology and type, location extent and timing of management disturbances.

We commend the Forest Service in its assessment of the natural watershed sensitivity in that the analysis incorporated many of the factors recommended in the Forest Service Handbook 2509.22 on Soil and Water Conservation. We would recommend however, that the final document include additional explanation of its progression from assessing watershed sensitivity to assigning threshold of concern (TOCs) values to determining equivalent roaded acres (ERAs) and finally evaluating the percent of the threshold of concern that could be reached by the proposed action. This process has been, and to certain extent continues to be, shrouded in mystery. These values do not provide a meaningful representation to the public without the context within which they ought to be interpreted. The final document needs to describe the context and range within which the values should be interpreted.

Specifically, the final document needs to provide the following information to fill in the gaps that currently exist in the analysis:

(1) Table 10 on page 29 of the Draft Supplement assigns TOC values to fourteen creeks within the project area which range from 8 to 12. The document needs to indicate the context and range within which these values should be interpreted. Specifically, does a TOC value of "0" indicate that the stream is in a degraded state or a stable state and how does that relate to a value of "10" or "20"?

(2) Appendix A, Tables A-1 through A-22, includes subtotals that exceed the sum of the acreages immediately preceding them in each of the tables. The document needs to identify the area to which this subtotal refers.

(3) The final document should identify the total acreages of each watershed considered and analyzed.

(4) The document needs to identify the point at which a threshold of concern requires investigation and/or action.

(5) The Draft Supplement needs to discuss the relationship of the CWE analysis to beneficial uses that have been identified within the watershed.

We are concerned about the scope of analysis which the document reflects, with specific regard to the restoration projects downfield of the proposed project area and the amount of predicted snow pack enhancement. The document assumes a uniform distribution and increase in snow pack of about five percent. In fact, it is our understanding that the topography of the area where dispensers will be placed creates a snowbelt. That is, the mountain range has a tendency to enhance precipitation naturally as it pushes the storm up and over its summit. The document makes no reference to this phenomenon nor does it consider the extent to which snow pack could be enhanced by 10 or 20 percent or more due to the project's position within a snowbelt. This leads to our second concern with regard to the scope, namely the restoration projects that lie downfield of the proposed project area.

We understand that there are number of restoration projects currently underway either in or adjacent to the proposed project area. The final document needs to identify and describe those restoration projects and consider (1) the potential effects that the predicted enhanced snow pack levels could have on the restoration projects, and (2) the potential effects that enhanced snow pack of a snowbelt area could have on the restoration projects. We believe the final document should discuss, at a minimum, the potential effects on the meandering stabilization study underway on the Middle Fork of the Feather River where Highway 89 crosses the river at Blairsden.

Table 11 on page 32 of the Draft Supplement refers to the Summary of TOCs and Current and Projected ERA Values. These values indicate that Jackson Creek is currently at 175 percent of TOC and that Squirrel, Greenhorn, Long Valley, Sulphur and Consignee Creek will approach or reach 100 percent of TOC through projected future land management disturbance, such as roadbuilding and timber sales. We recommend a commitment to closely monitor these creeks in particular, throughout the lifetime of the proposed project, in addition to the areas already considered in the monitoring plan.

It has also come to our attention that Poplar, Jamison and Frazier creeks have a high percentage of degraded stream miles in stream type C morphology. That is, the creek channels have low gradients, are unconfined with moderate to shallow channel entrenchment and are highly sensitive to erosion and channel degradation resulting from increased peak flows. We suggest that the monitoring plan also commit to increased observation of these creeks as well, particularly with regard to snow pack augmentation that may be underestimated.

The Draft Supplement indicates that cumulative watershed effects such as landsliding and peak flows are only likely to be observed in the proposed project area as a result of major rain on snow events. It also indicates that through project design, suspension criteria and scientific analysis of other cloud seeding programs that adverse watershed effects are expected to be insignificant or undetectable using normal operating procedures. To this statement, we would raise a question with regard to the suspension criteria; in particular, the criteria which refer to 60,000 cfs inflows into Oroville Reservoir and forecasts for flash-floods. We are not critical of the inflow and runoff criteria in and of themselves, but rather are more concerned with what the actual scope of the cloud seeding effort may be.

The Draft Supplement indicates on page 1 (Purpose and Need) that, "total increased precipitation would primarily be in the form of snowfall". On page 5 it indicates that, "Effects from the addition of the proposed cloud seeding program were determined to be negligible for the following reasons: . . . 4) cloud seeding will only occur when precipitation is in the form of snow at or below. . . ." That is, snowstorms, not rainstorms would be seeded. If snowstorms are seeded and the cumulative runoff would be experienced later during spring runoff, then the anticipated source of a 60,000 cfs winter inflow needs to be identified. There appears to be an inconsistency between the intended scope of the project and the actual implementation.

Page 45 of the Draft Supplement references past U.S. Bureau of Reclamation experience with snowstorm cloud seeding and indicates that, "In every serious precipitation or high streamflow event that occurred, seeding was suspended often several days before flooding became a problem." Again, we would make the comment that, if snowstorms, not rainstorms, are cloud seeded then runoff from the storms would not generally occur within days of the event, but rather in spring thaws. We recommend that the Final Supplement clarify the source of the 60,000 cfs inflow included as a cloud seeding suspension criterion.

Mitigation

The Draft Supplement indicates that the suspension criteria were designed to mitigate adverse impacts and protect beneficial uses. It also mentions that the project sponsors are active in a number of coordinated resource management groups. It does not however, specifically describe the tasks on which these groups focus. The Forest Service Handbook 2509.22 on Soil and Water Conservation in Chapter 23.63b refers to various mitigation measures. To the extent that future land disturbances such as timber sales and road building are expected in the area, these mitigation measures should be considered and incorporated in the final document.

We specifically recommend remedial measures such as landslide stabilization, road drainage improvement, obliteration of roads following timber sales, and timber stand reforestation.

Monitoring and Evaluation

We commend the project sponsors on the scope of the monitoring program they propose in Appendix C of the Draft Supplement. We suggest that as a part of the monitoring program the staff involved in the snow pack augmentation project coordinate with interdisciplinary (ID) teams overseeing projects which will cause land disturbances including, but not limited to, timber sales. We recommend that as a part of the coordination with other ID teams, that monitoring include a comparison of the predicted cumulative watershed sensitivity versus the actual watershed sensitivity observed from implementing the land management practices. Further, we suggest developing action levels and committing to implementing an action plan when monitoring and analysis indicates that cumulative effects have been underpredicted.

Effects of Project on sensitive, threatened and endangered
wildlife species

The Draft Supplement considers numerous environmental effects to wildlife that the proposed cloud seeding project may have, one of which includes the effect of delayed snowmelt. The Draft Supplement mentions that delayed snowmelt may effect north-facing slopes and dense coniferous cover, which goshawks and spotted owls select for nesting. We suggest that the final document include a discussion not only of the effects on nesting, but also a discussion of the effects of delayed snowmelt on the amount of forage that would be available to nesting species.

We support the recommendations made in the biological assessment on page 43 of the Draft Supplement and suggest that the Forest Service include these recommendations in its Record of Decision.

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

IO—Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC—Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO—Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU—Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1—Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2—Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3—Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

RESPONSE TO COMMENTS FROM THE U. S. ENVIRONMENTAL PROTECTION AGENCY:

Page 2, Item 1. Threshold of Concern (TOC) values are an estimate of the equivalent roaded acres (ERA or amount of land disturbance) a given watershed can support without degradation of beneficial uses. Low TOC values (0 to 6) indicate that the drainage is highly sensitive to land disturbance based partly on the physical and biological characteristics examined in the sensitivity matrix and partly on the observed response to its current level of disturbance. A low TOC is a sign of fragility, not an indication of a "degraded state". A high TOC value (12 or greater) indicates the watershed is less sensitive to land disturbance activities.

Page 2, Items 2 & 3. The tables in Appendix A of the Draft Supplement are in Appendix B (Tables B-1 through B-22) of the Final Supplement. The tables have been modified to indicate more clearly the acreages used in calculations of ERA, TOC, and % of TOC values. The total watershed acreages of each watershed is indicated in these tables in the last row as the Total .

Page 2, Item 4. Forest Service policy recommends investigation or action when an ERA value reaches 50 to 60 percent of TOC.

Page 2, Item 5. Using the U. S. Forest Service CWE methodology, adverse cumulative watershed effects to beneficial uses can be anticipated when ERA values exceed the TOC. On page 31 of the Supplement, we indicate that Jackson Creek, which currently has an ERA value 75 percent greater than TOC, had experienced adverse effects to coldwater fisheries due to increases in erosion, sedimentation, peak flows, and water temperatures. We can project that coldwater fisheries beneficial uses will be the first beneficial use to be impacted in other watersheds as well (when ERA values exceed TOC) due to the sensitivity of aquatic life to the types of land disturbance activities currently found in these watersheds. The proposed cloud seeding program is not expected to measurably increase, if at all, impacts to beneficial uses. Fish habitat, fish population, benthic macroinvertebrate, and water quality monitoring is being conducted to verify that the cloud seeding project is not contributing to adverse impacts.

Page 2, Concerns about seeding within a snowbelt: The basis for the design of the cloud seeding program is that moisture within storm systems passing over the Sierra Nevada is forced to rise over this barrier producing excess supercooled liquid water. It is this excess water which the seeding is attempting to convert to additional snowfall. Without this topographic influence, seeding could not be performed. For example, seeding of winter storms over the ocean would produce little in the way of additional precipitation because there is very little additional liquid water in the storms until they are forced to rise over the Sierra Nevadas. Part of the excess liquid water is used up by Mother Nature to produce additional precipitation over the Sierra Nevadas. This is why a place like Bucks Lake at 5,500 feet in the Sierra Nevadas receives over 70 inches of precipitation a year but Sacramento only 17

inches. This is commonly referred to as an orographic effect (as opposed to snowbelt).

The augmented snow estimated from seeding (average of 5 percent over the entire target and up to 10 percent above 5,500 feet elevation) is based on almost seven years of observations of the excess amount of supercooled liquid water available near the crest of the Sierra Nevadas. These observations along with seeding experiments conducted over the central Sierra Nevadas during the Bureau of Reclamation's ten year Sierra Cooperative Pilot Project have provided sufficient data on which to base this estimate. There is no data to suggest that increases of 20 percent or greater are possible given the limited cloud water available and the limited number of hours of seeding possible (300 hours).

Page 2, Restoration Projects: The modelling studies described in the supplement have shown that a 10 percent increase in snowpack will have little or no effect on peak flows. Therefore, this project should have no impact on restoration projects such as the proposed one mentioned near Blairsden. The meandering stabilization study mentioned in the comments is not currently underway. The California Department of Transportation has approached the North Fork Feather River Coordinated Resources Management (CRM) group to study and design a project to protect the bridge abutment at the Highway 89 bridge. The Department of Water Resources and U. S. Forest Service are both active members of this CRM group. No decision has been reached by the CRM group concerning whether to undertake this project. It is currently unknown whether this project is feasible, or if feasible what techniques will be used. We can speculate that if the project proves feasible, it will include a revegetation component and possibly in-channel structures as well.

Based on the information developed in the CWE assessment (page 36) we can project no impact to in-channel structures. No measurable increase in peak flows or watershed degradation (the principal CWE mechanisms inherent in this cloud seeding proposal) even during a worst case scenario are projected.

Approximately 30 percent of the water produced by this project is expected to be taken up by ground water recharge and vegetative transpiration. The availability of increased soil moisture resulting in reduced plant stress, and possibly increased growth rates, should aid revegetation efforts. Other secondary benefits include a slight increase in the amount of time streamflows are up, and increased summer flows. We expect that both short and long-term effects of the cloud seeding project on riparian rehabilitation/restoration efforts will be beneficial due to greater initial revegetation success and greater subsequent survival and growth rates.

Page 3, Stream Monitoring: U.S. Forest Service policy recommends investigation or action when watersheds on U. S. Forest Service lands reach 50 to 60 percent of TOC. Additional monitoring is required following land disturbance activities (timber sales, road construction, etc.). In addition to these monitoring efforts, the Department of Water Resources also plans to collect water quality information on

the mentioned streams (and others) during spring melt and other high flow periods.

Page 3, Suspension Criteria: As stated in both the Final Joint EIS/EIR and in the Draft Supplement, seeding will only be conducted when the snow line is below 5,000 feet elevation and icing is being detected at the mountain top observatories. This operating criteria was established for two reasons. First and foremost, the propane dispensers are at approximately the 7,000 foot elevation. If the freezing level is at or above 5,000 feet, the temperature at the dispensers will be too warm for the propane to work effectively. Secondly, snow retains the additional water produced from seeding until the spring when it is needed. It is well known that the highest inflows to Lake Oroville and the highest peak flows come from heavy rain events, when this rain is falling at elevations above 5,000 feet. Based on the seeding criteria for the project, seeding will not be conducted during these types of events.

The beginning of some warm storm events start out with fairly low freezing levels. This would allow seeding to be conducted. However, if forecasts indicate that the freezing levels will rise substantially and excessive rains are predicted to cause high flows exceeding the 60,000 cfs level, seeding will not be initiated. In the same manner, choosing the 60,000 cfs criteria will prevent seeding until after these high flows have receded. During the latter stages of storm systems that produce high freezing levels and excessive rainfall, the freezing level drops to below 5,000 feet. There may be sufficient supercooled liquid water to start seeding with propane. However, if inflows to Lake Oroville are greater than 60,000 cfs, or reservoir releases are being made in excess of power plant capacity, no seeding can be performed. This will assure that seeding does not begin until the effects of the heavy rain event have diminished substantially.

Page 4, Mitigation: Plumas National Forest Standards and Guidelines mandate the use of Best Management Practices such as the remedial measures mentioned in the comments. U. S. Forest Service Handbook 2509.22 (in effect since 1986) also requires the use of best management practices to reduce or eliminate watershed damage. Best Management Practices are included on all land disturbance projects (such as road building and timber sales) as part of the environmental documentation.

The best management practices the U. S. Forest Service uses relative to future land disturbance are site and project specific. As such, the logical (and legally required) place to incorporate them is in the environmental documentation of these land disturbance activities.

Page 4, Monitoring and Evaluation: The Department intends to coordinate with the U. S. Forest Service as well as other interested land management entities. Sediment, fish population, aquatic macroinvertebrate, and water quality monitoring has been initiated by the Department. This baseline information has already been requested by numerous agencies.

The Department agrees that monitoring the effectiveness of the U. S. Forest Service

cumulative watershed effects methodologies is desirable. Determining the level of accuracy of CWE predictions could provide more credibility and greater public acceptance of this methodology.

The purpose of the monitoring program is to detect (if possible) the environmental effects of the proposed project. If monitoring indicates that the cloud seeding program is producing significant adverse effects, the Department will modify the project to reduce or eliminate these adverse effects.

Page 5. Effects of Project on Sensitive, Threatened and Endangered Wildlife Species:
Neither goshawks nor spotted owls are tied to a territory until nesting begins. Both species migrate up and downslope in response to major storms. In the steep Feather River country, this up or downslope movement may involve very short distances.

Spotted owls begin to nest around March 1. Spotted owls in the project area feed largely upon flying squirrels and woodrats. Both prey species are nocturnal and do not hibernate. Flying squirrels are arboreal, while woodrats are semi-arboreal. Both prey species are active above the snow, and available to foraging owls throughout the winter. The 1 to 3 day delay in snowmelt produced by the proposed project will have no effect on spotted owl prey availability.

Nesting goshawks arrive several months later and rarely begin nesting before snowpack melt. Incubation behavior is rarely observed at the higher elevations in the project area until early to mid-June following snowmelt (Tom Ratcliffe, Zone Wildlife Biologist, pers. comm.). Goshawks have much wider food habits than spotted owls, preying on birds (up to grouse size) and mammals (up to marmot size) and some insects. A partial list of known goshawk prey items includes rabbits, hares, muskrats, squirrels, chipmunks, small house cats, weasels, shrews, mice, ducks, snipe, poultry, quail, grouse, small hawks and owls, pigeons, doves, woodpeckers, crows, kingfishers, blackbirds, robins, sparrows, locusts, grasshoppers, and moth and beetle larvae (Bent 1961). Delayed snowmelt (1 to 3 days) should not adversely affect forage availability to goshawks due to their late nesting habit and abundance of prey items which are active above the snow throughout the winter. Snow cover may make some prey items more visible, less mobile and thus more vulnerable to avian predators.



California Sportfishing Protection Alliance

Plumas National Forest
United States Forest Service
c/o Mr. Court Bennett, Planner
P.O. Box 11500
Quincy, CA 95971

October 1, 1991

Re: Prototype Project to Augment Snow Pack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties; Draft Supplemental to the Environmental Impact Statement; Comments by California Sportfishing Protection Alliance.

The California Sportfishing Protection Alliance (hereinafter known as "CSPA") and the Friends of Plumas Wilderness commented on the draft Environmental Impact Report [CEQA] and Environmental Impact Statement [NEPA] for the "Prototype Project to Augment Snow Pack by Seeding Using Ground Based Dispensers in Plumas and Sierra Counties [CSPA comments - June 12, 1990]". The CSPA commented on the draft EIR/EIS for the project and found the document inadequate and failing to comply to the requirements of CEQA and NEPA. The draft EIR/EIS was approved by the U.S. Forest Service and the California Department of Water Resources. An appeal was filed by the CSPA and Friends of Plumas Wilderness with the U.S. Forest Service for said approval. The appeal was affirmed by the U.S. Forest Service and this supplemental environmental document was required to be prepared by the U.S. Forest Service for said project.

The deadline date for comments on the draft supplemental document was September 30, 1991, however, in a letter from Gerald Boles, Chief, Water Quality and Biology Section, California Department of Water Resources, the deadline date for comments to the draft supplemental document was extended to October 7, 1991.

The following are the comments of the CSPA concerning the draft supplemental document for the project:

1. The proposed project is a five year prototype cloud seeding project proposed by the California Department of Water Resources. The proposed project would seed approximately 165,000 acres of the Upper Feather River Basin using a network of ground based, remotely operated liquid propane dispensers. Total augmented precipitation is expected to add about 32,000

acre-feet to the project watershed during an ideal cloud seeding season of near average, normal precipitation.

The affected environment is located almost totally within the Middle Fork Feather River drainage. The Middle Fork Feather River is a Wild and Scenic River and is part of the National Wild and Scenic Rivers system, and is protected by the federal Wild and Scenic Rivers Act [16 U.S.C. 1271-1287]. Congress declared that the Middle Fork Feather River possesses outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values, and that it shall be preserved in free-flowing condition to protect water quality and to fulfill other vital national conservation purposes, and that its immediate environment shall be protected for the benefit and enjoyment of present and future generations.

The Middle Fork Feather River is also a state designated "Wild Trout Stream". It is the policy of the State of California not to approve a project which affects "Wild Trout Streams".

The proposed project would alter and affect the free-flowing condition of the Middle Fork Feather River, as well as alter and affect water quality. The alteration to water quality may potentially have adverse impacts on the fish populations and habitat in the river. Consequently, the project would violate the purpose, intent and provisions of the Wild and Scenic Rivers Act.

The major streams being impacted by the project which discharge into the Middle Fork Feather River are all of the catchment areas of Willow Creek, Frazier Creek, Gray Eagle Creek, Jamison Creek, Long Valley Creek and Popular Creek. Due to the placement of the dispensers, three other streams will be partially impacted as their catchment areas are not entirely within the project impact area relative to the tracks of storms that may be seeded. These streams are the lower ends of Big Grizzly Creek and Sulphur Creek, and the upper catchment area of Nelson Creek, above the area designated as a "Wild Trout Stream". However, sedimentation and accelerated runoff caused by the project would flow downstream and affect the "Wild Trout" section of Nelson Creek.

Under "Wild Trout Waters" in the provisions of the California Fish and Game Code [Fish and Game Addenda], the policy of the California Fish and Game Commission is that all necessary actions, consistent with state law, shall be taken to prevent adverse impact by land or water development projects on designated wild trout streams. This policy is consistent with state policy that any project affecting "Wild Trout Streams" should not be approved by the State.

As stated beforehand, the proposed project would alter and affect the free-flowing condition of the Wild and Scenic Middle Fork Feather River, as well as alter and affect water quality. The alteration to water quality may potentially have adverse impacts on the fish populations and habitat in the river. The Wild and Scenic Middle Fork Feather River is also a designated "Wild Trout Stream". The proposed project would also alter and affect the waters of Nelson Creek, a designated "Wild Trout Stream".

Both the U.S. Forest Service and the California Department of Water Resources ignore the mandate of the Wild and Scenic Act, and also state policies by not only failing to address them, but failing to include the mandates and policies in the final EIR/EIS for the proposed project, as well as failing to address the mandates and policies in this draft supplemental document.

The CSPA believes the proposed project would violate the purpose, intent and provisions of the federal Wild and Scenic Rivers Act, as well as violate the policies of the State of California concerning protecting the environments of two designated "Wild Trout Streams".

2. The communities of Sloat, Cromberg, Johnsville, Plumas-Eureka Estates, Mohawk, Blairsden, Delleker, Graegle, Clio, and Portola are located within the project boundaries.

For the past five years the California Department of Water Resources has conducted or attempted to conduct cloud seeding projects affecting areas in Plumas County. Said cloud seeding projects for the past five years have been highly controversial among the residents of not only of the communities named above, but also in the greater Quincy area. The residents of these areas have expressed their concerns and opposition to cloud seeding projects, but both the U.S. Forest Service and the California Department of Water Resources have intensified their efforts towards approving a project which is not supported by the people who will be affected by it.

To the best of the CSPA's knowledge did the U.S. Forest Service and the California Department of Water Resources hold scoping meetings to address and evaluate the site specific concerns of the public and the residents in the above named communities concerning the draft supplemental document for the project. The failure of the U.S. Forest Service to hold scoping meetings in the areas and communities to be affected by the project on this draft supplemental document violates 40 CFR 1501.7, 1501.7 (a), (1), (2), (3), (4), (5), (6), (7), (7) (b), (7) (b) (1,2,3 & 4), and (7) (c). The scoping process is an important part of the EIS process and due process. Also under the CEQA Guidelines, a Notice of Preparation (NOP) should have been forwarded to all interested parties as required by the CEQA Guidelines. It was not.

For the U.S. Forest Service and the California Department of Water Resources to act in a vacuum without public input in the development of a scoping process for the draft supplemental document is not reasonable, not in public interest considering the public controversy of the project, nor is it in compliance with 40 CFR 1501.7 et seq. and the CEQA process.

3. The draft Joint Environmental Impact Report and Environmental Impact Statement [September, 1990] for the "Prototype Project to Augment Snow Pack by Seeding Using Ground Based Dispensers in Plumas and Sierra Counties was prepared jointly by the U.S. Forest Service and the California Department of Water Resources pursuant to the requirements of the California Environmental Quality Act [CEQA] and the National Environmental Policy Act [NEPA]. The draft joint EIR/EIS was found deficient by the U.S. Forest Service and a supplemental document was required to be prepared by the Regional Forester of the U.S. Forest Service

This draft supplemental document which is a result of the appeal is not being prepared as a joint supplemental EIR/EIS document pursuant to the requirements of CEQA and NEPA. As shown in the draft supplemental document [Abstract - page i] the draft supplemental document is a draft supplemental document to the EIS and not to the EIR. The appeal was filed because of the deficiencies in the joint EIR/EIS using the U.S. Forest Service appeal process. Had the appeal not been affirmed by the Regional Forester, the appellants would have filed court actions concerning the adequacy of the joint EIR/EIS for the project.

We believe the U.S. Forest Service and the California Department of Water Resources cannot change the legal process and only tier the draft supplemental document to the EIS. Clearly the draft supplemental document must also be tiered to the joint EIR/EIS and prepared pursuant to the requirements of both NEPA and CEQA as the original joint EIR/EIS was prepared. Consequently, the draft supplemental document for the project is unlawful and was not prepared and written in accordance with the requirements of both CEQA and NEPA.

For projects that must comply with both CEQA and NEPA, the CEQA Guidelines and the NEPA regulations strongly urge local, state, and federal agencies to work together to prepare a single document that will satisfy both state and federal law, (Section 21083.5; CEQA Guidelines, section 15222; 40 C.F.R. Part 1506, section 1506.2) The resulting document, such as this draft supplemental document tiered only to the EIS, will be inadequate if it satisfy one or the other statute or set of regulations or guidelines (Section 21083.5; CEQA Guidelines, section 15221, subd. (a).)

4. As stated in the draft supplemental document for the project [NATURE AND PURPOSE OF THE ACTION - page 1], the objective of this draft supplement to the EIS is to address the issues not affirmed by the Regional Forester, and that once addressed, a determination needs to be made as to whether this added information will require further changes to the Final EIS issued in

September of 1990. Six (6) issues were addressed and shown in the draft supplemental document. [NATURE AND PURPOSE OF THE ACTION - pages 1 and 2]

We disagree with the conclusions made in the draft supplemental document that only six issues need to be addressed, evaluated and mitigated. All of the issues discussed by the CSPA and the conclusions reached by the CSPA in its comments to the joint EIS/EIR for the project must be addressed and evaluated in the supplemental document to satisfy the requirements of NEPA and CEQA. We reference all of the comments made by the CSPA [June 12, 1990 - 34 pages] in the CSPA comments to this supplemental document. [see Exhibit "A"]

5. In the comments made by CSPA on the draft joint EIR/EIS on June 12, 1990, the CSPA stated the draft joint EIR/EIS was grossly deficient because the cumulative effects from the proposed project were not evaluated in the draft joint EIR/EIS. Specifically on pages 8 and 9 of the CSPA comments to the draft joint EIS/EIR the CSPA states that the potential cumulative effects to water quality and fishery habitat resulting from the project and resulting from proposed green and salvage timber sales was not discussed or evaluated. [see Exhibit "A"]

The draft supplemental document also failed to address or evaluate the potential cumulative impacts to water quality and fishery habitat in the Middle Fork Feather River watershed as a result of the proposed project and as a result of past, present and proposed green and salvage timber sales.

The draft supplemental document states that proposed timber harvest on public lands through 1993 are included in the current ERA value. [page 30] Should the project be approved this year, the impacts as a result of the project would occur for a five year period, or through the 1996-97 winter period. Consequently, the ERA values prepared through the year 1993 are deficient.

The draft supplemental document claims all proposed timber sales were included in the ERA value through the year 1993. The Forest Service planning process for green timber sales goes through a five year planning process. Consequently, the ERA values should have been prepared for a five year period and not a two year period which causes the ERA values to be deficient.

The draft supplemental document did not name the timber harvest sales or provide a specific location of the timber sale areas within the project area. The Plumas National Forest has a host of timber sales being proposed in watersheds flowing into the Middle Fork Feather River from the project area to Oroville Reservoir, as well as within the project area. The draft supplemental document did not evaluate the cumulative impacts to water quality, fishery habitat, scenic, recreational, geologic, wildlife, historic, cultural, and other similar values, and the free-flowing condition of the Middle Fork Feather River resulting from the project and past, existing

and future timber sales within the project area, as well as from the project area to Oroville Reservoir. The draft supplemental document is deficient for failing to evaluate the cumulative impacts to the Wild and Scenic Middle Fork Feather River within the project area, and downstream from the project area to Oroville Reservoir.

A watershed sensitivity rating was not prepared and included for the Middle Fork Feather River in the draft supplemental document. A erosion hazard rating (ERA) was also not prepared and included for the Middle Fork Feather River in the draft supplemental document. The draft supplemental document is deficient without this information and data.

A draft EIR must discuss "cumulative impacts" when they are significant. (CEQA Guidelines, section 15130, subd. (a).) These are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, section 15355; see also section 21083, subd. (b).) "Individual effects may be changes resulting from a single project or a number of separate projects." (CEQA Guidelines, section 15355, subd. (a).) "The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to the closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, section 153, subd. (b).)

A legally adequate "cumulative impact analysis" thus is an analysis of a particular project viewed over time and in foreseeable probable future projects whose impacts might compound or interrelate with those of the project at hand. Such an analysis "assesses cumulative damage as a whole greater than the sum of its parts". [*Environmental Protection Information center v. Johnson* (1985) 170 Cal. App. 3d 604, 625 (216 Cal. Rptr. 502, 515).] Such an analysis is necessary because "[t]he full environmental impact of a proposed...action cannot be gauged in a vacuum." (*Whitman v. Board of Supervisors* (2d Dist. 1979) 88 Cal. App. 3d 397, 408 [151 Cal. Rptr. 866, 872], quoting *Akers v. Resor* (W.D. Tenn. 1978) 443 F. Supp. 1355, 1360.) "[A]n agency may not....[treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is about one of several substantially similar operations....To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster." (*Whitman, supra*, 88 Cal. App. ed at 408 [151 Cal. Rptr. 866, 872], quoting *Natural Resources Defense Council v. Callaway* (2d Cir. 1975) 524 F. 2d 79, 88]. [see Exhibit "A" - CSPA comments to draft joint EIR/EIR concerning CEQA requirements and related court decisions.

A draft EIS must discuss "cumulative impacts" [40 CFR section 1508.7]. Under section 1508.7 "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what

agency (Federal and non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

6. The Final EIR/EIS nor this draft supplemental document failed to discuss the heart and purpose of the project, nor did the document discuss where the water produced by the project will be put to full beneficial use, nor did the document evaluate the potential cumulative impacts to fisheries in the Delta when the water is put to use by the California Department of Water Resources. This project may produce 160,000 acre-feet of water over a five year period for storage at Oroville Reservoir and also for use for State Water Project purposes. This water would be retained in storage and diverted from Oroville Dam to the Delta and diverted for State Water Project purposes at the State Pumps in the Delta.

From 1986 to 1990, fish losses at the state pumps were 2.8 million striped bass, 6.6 million chinook salmon and 71,000 steelhead trout. [Documented by Department of Fish and Game in annual Four Pumps Agreement Reports] Clearly the diversion of water from the Delta has caused adverse impacts to the state's fisheries.

The operation of the State Water Project and the state pumps by the California Department of Water Resources has adversely affected Delta smelt. Delta smelt population levels have declined by 90% from 2 million fish to 200,000 fish. The U.S. Fish and Wildlife Service plans to list the Delta smelt in the immediate future as "threatened" under the protection of the federal Endangered Species Act. [see CSPA Exhibit "B"]

Consequently, the California Department of Water Resources will use water produced by the project which will have an adverse impact to Delta smelt in the Delta and would jeopardy their existence, as well as having adverse impacts to other anadromous fish species in the Delta.

Before this project and the draft supplemental document is approved by the Forest Service, the California Department of Water Resources must consult with the U.S. Fish and Wildlife Service concerning the cumulative impacts to Delta smelt when the water produced by this project is put to use and diverted from the Delta. This consultation, once the Delta smelt is listed, will require a "recovery plan".

The draft supplemental document is deficient and not in compliance with the requirements of NEPA and CEQA because the document did not discuss and evaluate the cumulative impacts to the fisheries of the Delta from water produced by the cloud seeding project.

As stated beforehand, a draft EIR must discuss "cumulative impacts" when they are significant. (CEQA Guidelines, section 15130, subd. (a).) These are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other

environmental impacts." (CEQA Guidelines, section 15355; see also section 21083, subd. (b).) "Individual effects may be changes resulting from a single project or a number of separate projects." (CEQA Guidelines, section 15355, subd. (a).) "The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to the closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, section 153, subd. (b).)

A legally adequate "cumulative impact analysis" thus is an analysis of a particular project viewed over time and in foreseeable probable future projects whose impacts might compound or interrelate with those of the project at hand. Such an analysis "assesses cumulative damage as a whole greater than the sum of its parts". [*Environmental Protection Information Center v. Johnson* (1985) 170 Cal. App. 3d 604, 625 (216 Cal. Rptr. 502, 515).] Such an analysis is necessary because "[t]he full environmental impact of a proposed...action cannot be gauged in a vacuum." (*Whitman v. Board of Supervisors* (2d Dist. 1979) 88 Cal. App. 3d 397, 408 [151 Cal. Rptr. 866, 872], quoting *Akers v. Resor* (W.D. Tenn. 1978) 443 F. Supp. 1355, 1360.) "[A]n agency may not...[treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is about one of several substantially similar operations....To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster." (*Whitman*, supra, 88 Cal. App. ed at 408 [151 Cal. Rptr. 866, 872], quoting *Natural Resources Defense Council v. Callaway* (2d Cir. 1975) 524 F. 2d 79, 88]. [see Exhibit "A" - CSPA comments to draft joint EIR/EIR concerning CEQA requirements and related court decisions.

A draft EIS must discuss "cumulative impacts" [40 CFG section 1508.7]. Under section 1508.7 "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal and non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

7. In the CSPA comments on the draft joint EIS/EIR for the project [see Exhibit "A"] CSPA discusses alternatives. The draft supplemental document fails to discuss additional alternatives to the proposed project.

The draft supplement document states that one of the objectives of the draft supplement is to determine whether additional alternatives need to be considered as a result of the analysis of the appeal issue. The draft supplemental document states that based on these analysis, there are no basis for considering additional alternatives beyond those discussed in the Final EIS [final joint EIR/EIS] for the project. The CSPA disagrees with this conclusion.

Like the requirement to describe mitigation measures within an EIR, the requirement to set forth project alternatives within the document is also crucial to CEQA's mandate that avoidable significant environmental damage be avoided where feasible. (Section 21002; CEQA Guidelines, sections 15002, subd. (a)(3), 15021, subd. (a)(2), 15126, subd. (d).)

To allow agencies to effectuate this substantive requirement at the findings stage of the CEQA process, EIRs must produce information sufficient to permit a reasonable choice of alternatives so far as environmental aspects are concerned. A draft EIR thus must describe a range of reasonable alternatives to the proposed project, or to its location, that could feasibly attain the project's basic objectives, and must evaluate the comparative merits of each alternative. (CEQA Guidelines, section 15126, subd. (d); section 21100, subd. (d).)

The discussion of the project must focus on alternatives capable of either eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if such alternatives would be more costly or to some degree would impede the project's objectives. (CEQA Guidelines, section 15126, subd. (d)(3).)

One of the alternatives analyzed must be the "no project alternative" It must describe what condition or program preceded the project. If the no project alternative is environmentally superior to all others, the EIR must also identify which of the others, as among themselves, causes the least environmental damage. (CEQA Guidelines, section 15126, subd. (d)(2).)

Under 40 CFR section 1502.14, alternatives including the proposed action is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment [section 1502.15] and the Environmental Consequences [section 1502.16], it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining this issues and providing a clear basis for choice among options by the decisionmakers and the public.

Under 40 CFR section 1502.14 (a), the agency (s) is required to rigorously explore and objectively evaluate all reasonable alternatives, and for all alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

Clearly the supplemental document violates 40 CFG section 1502.14 and section 1502.14 (a). To simply state that the alternative requirement under NEPA is being discarded based on these analysis and that there are no basis for considering additional alternatives beyond those discussed in the Final EIS [final joint EIR/EIS] for the project is not in compliance with 40 CFR section 1502.14 and section 1502.14 (a). Also the "no project" alternative is not discussed or evaluated in comparative form in the supplemental document.

40 CFR section 1502.14 (d) requires the no action alternative be discussed and evaluated.

Alternatives which should have been discussed and evaluated in the Final EIR/EIS, and also in the draft supplemental document are as follows:

a) Using water conservation measures by water contractors who use State Water Project water by having them conserve the same amount of water proposed by the project [32,000 acre-feet]. This "no project" alternative would be consistent with the California Water Code and would prevent potential adverse impacts to the environment [water quality, fisheries, etc.] within the project, downstream of the project in the Wild and Scenic Middle Fork Feather River and other watersheds within the project area.

b) Reducing water deliveries by 32,000 acre-feet or more from Oroville Reservoir for State Water Project purposes. This "no project" alternative would prevent the waste of the state's water and prevent potential adverse impacts to the environment [water quality, fisheries, etc.] within the project, downstream of the project in the Wild and Scenic Middle Fork Feather River and other watersheds within the project area.

Clearly there are alternatives in which the draft supplemental document must consider in determining the alternative which would least affect the environment.

The CSPA formally request the California Department of Water Resources and the U.S. Forest Service to include the above mentioned alternatives in the final supplemental document.

8. The draft supplemental document failed to include pertinent new information. This new information is as follows. Apparently before or during the appeal period, the California Department of Water Resources installed the ground based cloud seeding dispensers in the project area. After the appeal was affirmed by the Regional Forester, the California Department of Water Resources transported the dispensers to a location near the project area for storage purposes.

Plumas County objected to the storage location of the ground dispensers without a special use permit because it violated the requirements of the County Timberland Production Zone [TPZ]. In a letter dated February 2, 1991, from Linda Ackley, Staff Counsel, California Department of Water Resources, to John McMorro, Planning Director, Plumas County, the California Department of Water Resources cited its immunity from local land use regulations. Staff Counsel for the California Department of Water Resources stated that " Accordingly, under this legal principle of state sovereignty, the Department's weather modification program is not subject to Plumas County's Special Use Permit requirements ". [see CSPA Exhibit "C"]

In addition Staff Counsel for the California Department of Water Resources stated to the Plumas County Planning Director that, " To the degree that the Department has responsibilities, under CEQA and other laws, to mitigate for the impacts of our project, we would like to discuss with you possible ways for designing mitigation measures to reduce the County's additional costs. " [see CSPA Exhibit "B"]

On June 4, 1991, CSPA also objected to the storage of the cloud seeding dispensers and the impacts to the environment, and required the California Department of Water Resources to prepare a CEQA document for the storage of said dispensers. [see CSPA Exhibit "C"] A CEQA document was not prepared by the California Department of Water Resources for the storage of said dispensers.

The storage of the cloud seeding dispensers is part of the proposed project. The Final EIR/EIS and also the draft supplemental document failed to discuss this part of the project and the potential direct, indirect and cumulative impacts to the human environment. There are a host of potential impacts to the human environment from the storage of said dispensers. i.e. The potential adverse impacts from the fire danger to the timberland management zone and local residents; the fire danger to local residential dwellings near the storage area; the danger of accidents occurring from the hauling of the dispensers by helicopter to and from the project area; the danger of leakage of propane and the effects to air quality, etc.

A draft EIR must discuss "cumulative impacts" when they are significant. (CEQA Guidelines, section 15130, subd. (a).) These are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, section 15355; see also section 21083, subd. (b).) "Individual effects may be changes resulting from a single project or a number of separate projects." (CEQA Guidelines, section 15355, subd. (a).) "The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to the closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, section 153, subd. (b).)

A legally adequate "cumulative impact analysis" thus is an analysis of a particular project viewed over time and in foreseeable probable future projects whose impacts might compound or interrelate with those of the project at hand. Such an analysis "assesses cumulative damage as a whole greater than the sum of its parts". [Environmental Protection Information center v. Johnson (1985) 170 Cal. App. 3d 604, 625 (216 Cal. Rptr. 502, 515).] Such an analysis is necessary because " [t]he full environmental impact of a proposed...action cannot be gauged in a vacuum. " (Whitman v. Board of Supervisors (2d Dist. 1979) 88 Cal. App. 3d 397, 408 [151 443 F. Supp. 866, 872], quoting Akers v. Resor (W.D. Tenn. 1978) 443 F. Supp.

1355, 1360.] " [A]n agency may not....[treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is about one of several substantially similar operations....To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster." (Whitman, supra, 88 Cal. App. ed at 408 [151 Cal. Rptr. 866, 872], quoting Natural Resources Defense Council v. Callaway (2d Cir. 1975) 524 F. 2d. 79, 88). [see Exhibit "A" - CSPA comments to draft joint EIR/EIR concerning CEQA requirements and related court decisions.

A draft EIS must discuss "cumulative impacts" [40 CFG section 1508.7]. Under section 1508.7 "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal and non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

9. The Final EIR/EIS, and also the draft supplemental document, did not provide site specific information and data, and did not evaluate the potential direct and cumulative impacts to fish population, habitat and aquatic life [food source - wild trout] as a result of the project and other activities on the existing condition of fish population and habitat in the Wild and Scenic Middle Fork Feather River [Wild Trout Stream], Nelson Creek [Wild trout Stream], Willow Creek, Frazier Creek, Gray Eagle Creek, Jamison Creek, Long Valley Creek and Popular Creek, including Big Grizzly Creek, Sulpher Creek and Nelson Creek.

On page 92 of the draft supplemental document it is stated that the project is expected to sustain runoff for a slightly longer period, which may benefit aquatic life, and that effects from the project may not be measurable due to natural population variations.

The draft supplemental document does not provide any information, data or the results of studies which evaluated the potential cumulative impacts to fish populations and habitat, and aquatic life as a result of the project and other activities such as green and salvage timber sales. Both CEQA and NEPA, as stated beforehand requires all cumulative impacts to be evaluated.

The writeup in the draft supplemental document on page 92 states that post project monitoring of water quality will provide use information for determining project effects. Without pre-project baseline data on fish population and habitat, the California Department of Water Resources cannot determine the potential adverse direct and cumulative impacts to fish populations and habitat, and aquatic life. Consequently, the draft supplemental document is deficient for the above mentioned reasons.

10. On pages 7 and 8 of the draft supplemental document, a "Water Quality Protection Criteria" is addressed. The criteria for suspension of cloud seeding activities for the project is expressed on the contents of the snowpack, the potential for excessive runoff, whenever an inflow of 60,000 cfs or more into Oroville Reservoir, and other measures.

During a below normal water year, salvage logging in the Last Chance Creek watershed of the Plumas National Forest led to catastrophic soil erosion and damage that will take centuries to heal. In 1990, one heavily logged area in this watershed lost nearly a quarter-million tons of topsoil during a single storm.

If a criteria such as the water quality criteria for the project was in place, cloud seeding operations would not have been stopped. A warm rainfall in the spring could also occur during project operation sending the natural and man made melting snowfall and sedimentation downstream throughout all watersheds in the project area and adversely affecting the Wild and Scenic Middle Fork Feather River, as well as the watersheds. Also the communities in the project area could also be adversely affected.

This clearly shows the Water Quality Protection Criteria for the project has the potential to cause cumulative impacts to the environment because adverse impacts could occur during below normal precipitation. Both CEQA and NEPA requires cumulative impacts to be discussed and evaluated.

There is presently a proposal by the California Department of Water Resources before the U.S. Army Corps of Engineers concerning changing the flood control levels at Oroville Reservoir. The Final EIR/EIS and the draft supplemental document did evaluate the effects from project water entering Oroville Reservoir and the resulting indirect effects to the existing flood control level and the proposed flood control level. A discussion and an evaluation of the flood control levels at the reservoir should have been included in both the Final EIR/EIS and the draft supplement document. It was not and consequently the draft supplemental document is deficient.

11. In the CSPA comments on the Final EIR/EIS we stated that the California Department of Water Resources did not coordinate with the California Department of Fish and Game in implementing the Wild Trout Management Plan for Nelson Creek and complying to the PNF Standards and Guidelines for Nelson Creek. The same to true for the draft supplemental document. In the draft supplemental document it is stated that the California Department of Fish and Game received a copy of the draft EIR/EIS, but choose not to comment on any portion of the draft EIR/EIS. Regardless whether the California Department of Fish and Game choose not to comment on the draft EIR/EIS, the PNF Standards and Guidelines for Nelson Creek requires consultation, and that consultation was not included in the draft supplemental document. The supplemental document is deficient without this coordination and the implementation of the PNF Standards and Guidelines.

12. The Final EIR/EIS and this draft supplemental document do not comply to the PNF Standards and Guidelines, and RX-2 prescription for the Wild and Scenic Middle Fork Feather River. We reference our comments to the Final EIR/EIS to the draft supplemental document. The draft supplemental document is deficient without complying to the RX-2 Prescription and Standards and Guidelines for the Wild and Scenic Middle Fork Feather River.

13. The Final EIR/EIS and this draft supplemental document did not include a legal opinion from the Forest Service solicitor's office concerning whether the proposed project can be approved because it would affect the Lake Basin Area. We reference our comments to the Final EIR/EIS to the draft supplemental document. The CSPA believes the draft supplemental document is legally deficient without this legal opinion.

14. The Final EIR/EIS and this draft supplemental document do not comply to the PNF Forestwide Standards and Guidelines. We reference our comments to the Final EIR/EIS to the draft supplemental document. The draft supplemental document is deficient without complying to the Forestwide Standards and Guidelines.

15. The project which was evaluated in the Final EIR/EIS was estimated to produce about 21,000 acre-feet of water. The project being considered in this draft supplemental document is estimated to produce 32,000 acre-feet of water, an increase of about 50%. This is new information. The increase in the water produced by the project changes the potential direct, indirect and cumulative impacts to the environment, and may cause greater potential harm to the environment. Consequently because of this new information and the change in the project, the Final EIR/EIS is deficient. The draft supplemental document is also deficient because it only addressed six issues pertaining to the project and it do not addressed or evaluate the change to the project caused by the increased water created by the project as shown in the draft supplemental document.

16. Approximately 15 pairs of spotted owl [California] are known to nest within the project area. [page 38 - draft supplemental document] Two propane dispensing sites are located within active spotted owl territories (propane dispensers No. 2 and No. 5). One precipitation gauging station is also located within an active spotted owl territory (precipitation gauge No. 10). According to the draft supplemental document [page 38], this spotted owl territory is closed to entry from March 1 through August 31. If alternative sites for propane dispensers and precipitation gauges cannot be selected, then required maintenance and spring removal of these facilities may be affected. Both spotted owls and goshawks winter within the project area and may move downslope during periods of inclement weather.

As stated in the draft supplemental document, no cumulative impacts to "listed" wildlife species have been identified related to this cloud seeding project.

As stated beforehand, cloud seeding dispensers were installed in the project area by the California Department of Water Resources. The dispensers were removed by the California Department of Water Resources to a storage area. The removal of the dispensers may have caused potential adverse impacts to spotted owls and their habitat.

The draft supplemental document failed to evaluate and prevent potential direct, indirect and cumulative impacts to spotted owl and their territory from the installation and removal of dispensers to the storage area.

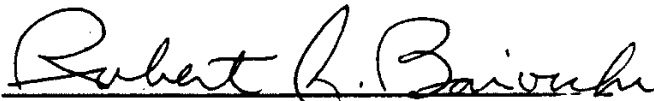
A spotted owl study, the Verner Study is in progress and expected to be completed in January, 1992. That study may result in a new regional policy. The Regional Forester is expected to issue a new interim standard under a Notice of Intent to revise the regional policy.

The proposed project is for a five year period. The proposed project may jeopardize spotted owls and their habitat, and may well conflict with the new regional policy to protect this species. SOHA territories may be enlarged in the project area which may prohibit entry and/or any activity affecting their well being and habitat. The Verner study, which will be completed in January, 1992, may show the proposed project will have direct, indirect and cumulative impacts to spotted owls and their habitat, and should not be approved.

The final supplemental document should be amended to comply fully with the new regional policy for spotted owls which may be jeopardized by the proposed project.

In conclusion the draft supplemental document and the summary of findings in the document are deficient and in violation of state and federal law. Please provide Mr. Mike Jackson and me with copies of the final supplemental document for the project, including copies of the decision memo.

Respectfully Submitted



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Quincy, CA 95971
Office Tel: 916-283-3767

Certificate of Service

On August 15, 1991, by letter, Gerald Boles of the California Department of Water Resources directed the California Sportfishing Protection Alliance to address any comments to Mr. Court Bennett, U.S. Forest Service, P.O. Box 11500, Quincy, CA 95971 regarding the draft Supplement to the Environmental Impact State for the Prototype Project to Augment Snow Pack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties. On the date shown below we have forwarded to Mr. Bennett our written comments and exhibits by first class mail.

Mr. Court Bennett, Planner
Plumas National Forest
U.S. Forest Service
P.O. Box 11500
Quincy, CA 95971

Mr. Ronald Stewart, Regional Forester
U.S. Forest Service
630 Sansome Street
San Francisco, CA 94111

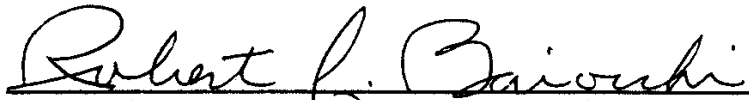
Mr. Mike Jackson, Counsel
California Sportfishing Protection Alliance
P.O. Drawer 207
Quincy, CA 95971

Mr. Jim Crenshaw, President
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Mr. Robert V. Cohune
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Truckee, CA 95737

Interested Parties

Dated: October 1, 1991

A handwritten signature in cursive script, reading "Robert J. Baiocchi", written over a horizontal line.

Robert J. Baiocchi, Executive Director, CSPA
P.O. Box 357
Quincy, CA 95971

RESPONSE TO COMMENTS FROM THE CALIFORNIA SPORTFISHING PROTECTION ALLIANCE:

The California Department of Water Resources and U. S. Forest Service prepared a Joint Environmental Impact Statement - Environmental Impact Report for the Prototype Project to Augment Snowpack by Cloudseeding Using Ground Based Dispensers in Plumas and Sierra Counties in September 1990. The Department of Water Resources filed a Notice of Determination on September 7, 1990 with the California Office of Planning and Research as required by CEQA. The Forest Supervisor for the Plumas National Forest issued a Record of Decision on September 12, 1990. The Forest Supervisor's decision to authorize cloud seeding was appealed to the Forest Service's Pacific Southwest Regional Forester who affirmed all but six issues raised by appellants. The Draft Supplement addressed these issues. Information in the Supplement will be considered with that in the Joint EIS/EIR by the Forest Service in deciding whether to allow the project to proceed.

Item 1. As previously discussed in the Joint EIS/EIR (pages F-50 to F-51), the Wild and Scenic Rivers Act and designation as a wild trout stream do not prevent projects such as cloud seeding in watersheds of designated streams. Designation as wild and scenic protects streams by preventing activities that adversely effect the free-flowing condition and natural character. Streams are designated by the California Protected Waterway Plan or as a wild trout stream that provide excellent habitat for naturally reproducing trout. The proposed cloud seeding program does not conflict with these designations or management plans since no diversions or impoundments are proposed, and no adverse effects to the fishery, water quality, or the natural character of the streamside environment are anticipated.

Item 2. The Department of Water Resources, in coordination with the U. S. Forest Service, has been developing a cloud seeding project in Plumas and Sierra counties since 1987. The early phases of this project were designed to develop and test dispenser equipment, determine release rates, evaluate performance, and develop suspension criteria. Following this initial phase, the current project was developed to determine the feasibility of augmenting the water content of the snowpack by cloud seeding using ground based propane dispensers. Numerous comments have been received by both opponents and proponents of the project. The project has been developed to alleviate as many concerns as possible of residents in the project area.

Section 40 CFR 1501.7 requires scoping for environmental impact statements. Numerous scoping meetings were held to receive public input prior to completion of the Draft EIS/EIR. In January 1988, scoping meetings were held in Loyaltan, Portola, Quincy, and Greenville. In February and March of 1988, additional scoping meetings were held in the same four communities. A local Citizens Committee was also formed to provide input into the design of the project. No discussion of supplemental statements is contained in section 40 CFR 1501.7. Section 40 CFR 1502.9 discusses preparation of supplemental statements. This section states that

agencies shall prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement. Notice of availability of the Draft Supplement was published in the Federal Register on August 23, 1991, as required by NEPA. In addition, newspapers and radio stations were provided a summary of information in the Draft Supplement. Copies of the Draft Supplement were sent to the Plumas and Sierra County Boards of Supervisors and to all individuals who had requested to be kept informed of the status of the project. Thus, the supplement was in fact prepared and circulated as required by NEPA.

Filing of the Notice of Determination completed requirements for the project under CEQA. No appeals under CEQA were filed. Since CEQA requirements had been completed, the Draft Supplement was not circulated pursuant to CEQA and no Notice of Preparation was needed. The Supplement was prepared pursuant to NEPA since an appeal was filed under this process with the U. S. Forest Service.

Item 3. The Notice of Determination for the project was filed on September 7, 1991. Filing of the Notice starts a 30-day statute of limitations on court challenges to the approval under CEQA. No challenges were filed, thus concluding the CEQA process. The appellants filed a Notice of Appeal with the U. S. Forest Service on October 29, 1990, which was well beyond the statute of limitations for such challenges under CEQA. Had portions of the appeal not been affirmed by the Regional Forester, the appellants would not have been able to pursue legal challenges under CEQA since the statute of limitations had expired even before the appeal was filed. Since no appeal was filed under CEQA, the Draft Supplement was circulated pursuant only to the requirements of NEPA. CEQA allows State consideration of a supplement prepared pursuant to NEPA. Information provided in the supplement indicate that there are no significant effects not previously addressed under CEQA, and therefore no reason to tier the supplement to the previously prepared EIR.

The CEQA Guidelines (section 15222) urges preparation of single documents where both CEQA and NEPA are involved, hence the Joint EIS/EIR was prepared for this project. Contrary to the position stated by the appellants, CEQA Statutes section 21083.5 does not contain language that would make the Draft Supplement inadequate. CEQA Statute section 21083.5 states that an EIS may be submitted in lieu of an EIR. Section 15221 of the CEQA Guidelines states that the EIS should be used rather than an EIR if the EIS will be prepared prior to the EIR and the EIS complies with the provisions of the CEQA Guidelines. These requirements were satisfied by the Joint EIS/EIR.

It should be noted that the standards for requiring preparation of an EIR under CEQA are different from the standards in NEPA for requiring preparation of an EIS. Originally CEQA followed the provision in the NEPA guidelines that called for preparing an EIS where there was serious public controversy over the environmental effects of a project. Due to an amendment to the CEQA statute, the existence of public controversy over the environmental effects of a project no longer

requires preparation of an EIR if there is no substantial evidence before the lead agency that the project may have a significant effect on the environment (Public Resources Code Section 21082.2(a)). Further, a supplement is required under CEQA where there is substantial evidence of some new significant effect on the environment (State CEQA Guidelines Sections 15162 and 15163).

The Department of Water Resources had originally recommended preparation of a negative declaration for this project because there was no substantial evidence that the project would cause a significant effect on the environment. The Forest Service decided to prepare an EIS for the project due to the serious public controversy generated by the California Sportfishing Protection Alliance. The EIS did not identify any significant effects, and the comments did not present substantial evidence to support their claims of environmental problems caused or aggravated by this project.

The Forest Service appeal process directed that a supplement be prepared to the EIS to fill in a number of details. The appellate decision did not identify any significant environmental effects not addressed in the EIS. The decision did not present the kind of information that would require preparation of a supplement under CEQA. As a result, after the notice of determination was filed by the Department, the Department decided not to prepare a supplement to the EIR. The comments confirm that the Department was on the right track in not preparing a supplement under CEQA. The comments, especially those of the California Sportfishing Protection Alliance, made allegations with much sound and fury, but without substantial evidence to back up the claims.

Item 4. All the concerns and allegations presented by the California Sportfishing Protection Alliance (Appendix F) were evaluated and addressed in the Final Joint EIS/EIR on pages 48 to 59 of Appendix F. The Draft Supplement was prepared in response to the decision by the Regional Forester that insufficient information was presented for six issues in the Final Joint EIS/EIR. The Draft Supplement was prepared to provide the additional information. Information contained in the supplement shows that the project will have no discernable environmental impact and provides no basis for changing the conclusions in the Final Joint EIS/EIR. Information in the Final Supplement will be considered with that in the Joint EIS/EIR by the Forest Service in deciding whether to allow the project to proceed.

Item 5. As discussed in the Final Joint EIS/EIR, Forest operations, including green and salvage timber sale projects and mining activities, require development of Best Management Practices to prevent adverse effects of erosion and to protect water quality and wildlife habitat. Any salvage of timber due to effects of drought or fire will require thorough evaluation of impacts to soil and water resources. Such evaluation, and runoff patterns associated with snowmelt, would reduce any adverse effects due to timber sale projects to insignificant levels. Snowpack augmentation has the potential of reducing the loss of trees to drought in future years, thus contributing to reduction of soil disturbance activities.

Also as discussed in the Final Joint EIS/EIR, comments of the California Sportfishing Protection Alliance suggest that everything in the area is part of a cumulative impact. The effects of the cloud seeding project are different from the logging activities which the appellants listed as the main contributors to erosion of soil and turbidity in streams. The main human activities contributing to erosion in the forest are the disturbance of soil and the exposure of bare soil to the erosive effects of rapid runoff. This project will disturb the soil only where the supports are emplaced to hold the propane tanks and other equipment. These areas will be small. Because they will be located on the ridgetops, they will receive little runoff from lands upslope from them. We expect no significant erosion impacts from the emplacement of the propane tanks directly, indirectly, or cumulatively. NEPA and CEQA require discussion of cumulative impacts of closely related projects only if they are considered to be significant. Effects from other activities in the watershed are discussed in the Final Joint EIS/EIR to the extent that the proposed project creates effects in the project area. Effects in the watershed from the proposed project are considered to be insignificant.

The Draft Supplement addressed and evaluated the cumulative effects of the proposed project on pages 5 through 37 and on page 42. The cumulative effects of the project in relation to past, present and future timber harvest, roading, mining, grazing, wildfire and subdivision land uses were addressed and evaluated in the Draft Supplement.

Current ERA values include planned timber harvest activities on public lands through 1993, as discussed on page 30 of the Draft Supplement. The Draft Supplement also states that projected ERA values for public lands timber harvest included planned timber harvest during 1994, 1995 and 1996, thus ERA values were prepared for a five year period. Current ERA values are shown in Tables B-1 through B-9 in Appendix B of the Final Supplement. Projected ERA values through 1996 are presented in Tables B-10 through B-22.

As mentioned in the response to Item 4, the U. S. Forest Service Regional Office requested supplemental information on six issues. Among those issues was the need to provide additional information on several watersheds recognized by appellants, the Plumas National Forest and the Department of Water Resources as representing the most sensitive and or degraded systems in the project area. The main stem of the Middle Fork Feather River was not identified by appellants, the U. S. Forest Service or the Department of Water Resources as among the most sensitive or degraded systems. Based on the analyses of the watersheds leading into the Middle Fork, impacts should be minimal, if at all measurable, to this river.

Cumulative watershed effects (CWE) analyses of those watersheds considered the most degraded or sensitive indicated that some watersheds have been impacted by past land uses and that the potential exists for significant problems to occur in the future. However, these problems are not expected to be measurably increased, if at all, by the proposed cloud seeding program. This projection is based on the

examination of the CWE mechanisms associated with cloud seeding (in a worst case scenario) and are contained on pages 32 to 36 of the Draft Supplement. If the effects of the proposed cloud seeding project are undetectable in the most sensitive and degraded streams within the project area under a worst case scenario, then cumulative watershed effects in the massive Middle Fork Feather River as a whole are certainly well below detection limits. However, if the project proves feasible, increased instream and downstream beneficial uses may occur.

Item 6. As discussed in the Final Joint EIS/EIR, the heart and purpose of the project is to determine if cloud seeding can be used in a portion of the Middle Fork Feather River watershed to increase water yields for downstream beneficial uses. The purpose of the supplement was to address those issues raised by the appellants that were not affirmed by the U. S. Forest Service Regional Office, and to address any further comments made during the public review of the Draft Supplement. The project design and purpose are experimental in nature. If the project proves feasible, downstream beneficial uses may include (1) additional storage in Lake Oroville for recreation, fish and wildlife habitat, (2) additional fresh-water releases for anadromous fisheries, wetland preservation, and delta smelt management, and (3) agricultural, industrial and municipal water supply.

Over a five year period of near average precipitation, the cloud seeding program could add about 160,000 acre-feet of precipitation to the project area. However, due to evapotranspiration losses (discussed in detail in Item 15), actual runoff below the project area may amount to only about 112,000 acre-feet (22,400 acre-feet per year) if all five years of cloud seeding were conducted in years of near average precipitation. Providing additional water to Lake Oroville or delta outflow will in no way adversely effect Delta smelt. The estimated production of 22,400 acre-feet of water in a year of average rainfall is only an incidental benefit to the State Water Project, which exported 2,246,000 acre-feet from Lake Oroville in 1989 (the most recent year of full delivery of all contractual requests from the water contractors). The less than one percent increase in water supply from the cloud seeding project is insignificant in relation to total export from Lake Oroville. In 1989, inflow to the Delta from all sources amounted to 14,018,000 acre-feet of water, with total exports of 6,856,000 acre-feet. The incremental increase of 22,400 acre-feet from the cloud seeding project is less than two-tenths of one percent of total Delta inflow, and about three-tenths of one percent of total Delta exports. Clearly the incidental benefit of 22,400 acre-feet of water in a year of average precipitation will have an imperceptible effect on Delta fisheries.

The Department of Water Resources is currently consulting with the California Department of Fish and Game, the U. S. Fish and Wildlife Service, and the National Marine Fisheries Service on Delta smelt and other fisheries issues as part of on-going environmental studies in the Delta, unrelated to the cloud seeding project. The Department has completed a number of environmental documents which evaluate and mitigate Delta fisheries impacts, including the South Delta Water Management Program (Draft EIR/EIS, July 1990), the North Delta Program (Draft

EIR/EIS, November 1990), the Additional Pumping Units, Harvey O. Banks Delta Pumping Plant (Final EIR, January 1986), Two Agency Fish Agreement (December 1986), and Framework Agreement (October 1990). The California Sportfishing Protection Alliance has had the opportunity to comment on the documents prepared pursuant to CEQA. In addition, the State Water Resources Control Board sets standards for Delta protection with which the Department must comply. The State Water Project is not operated in violation of the Federal Endangered Species Act or other regulations. If it appears that the Department's pumping may result in take of listed Delta smelt, then the Department will apply for a Section 10a permit as required under the Federal Endangered Species Act.

Item 7. The California Sportfishing Protection Alliance comments on the Draft Joint EIS/EIR (Appendix F) did not include discussion of alternatives.

Both CEQA and NEPA require discussion of reasonable alternatives to a project which could feasibly attain the basic objectives of the project (Citizens of Goleta Valley et al. vs. Board of Supervisors of the County of Santa Barbara (December 31, 1990) 91 Daily Journal D. A. R. 129). The measures suggested by the California Sportfishing Protection Alliance in the comments to the Draft Supplement would not feasibly obtain the basic objectives of the project, and thus are not considered reasonable alternatives. In addition, water conservation measures are already in place by State water contractors. Delivery of water from the State Water Project for downstream beneficial uses is not a waste of the States water.

The objective of the project is not simply to increase water yield by 32,000 acre-feet per year. The basic objective of the project is to determine the feasibility of augmenting the water content of the snowpack using cloud seeding from ground based generators, and thus increase runoff to Lake Oroville. The project is designed to provide information needed for verification of snowpack augmentation by cloud seeding, for continued evaluation and technical refinement of equipment, and for analysis of operational costs.

Alternatives were discussed in the Joint EIS/EIR on pages 7 to 23. Alternatives considered but eliminated from further study due to unacceptable environmental effects included aerial release of CO₂ pellets or silver iodide, ground-based release of silver iodide in the Bucks Lake region, and ground release of seeding agents other than silver iodide or propane, including liquid CO₂, liquid N, and inactivated bacteria. Alternatives considered and evaluated in depth included ten ground-based dispensers for release of silver iodide, ten ground-based dispensers for release of propane, one to three ground-based dispensers for release of propane, and the no project alternative. The alternative using ten ground-based propane dispensers was selected as most feasible in providing information to determine the effectiveness of snowpack enhancement while avoiding significant environmental effects. The no project alternative was not adopted since this alternative would not obtain the basic objectives of the project. No new information was found during preparation of the Draft Supplement that suggested additional alternatives should be considered.

Item 8. The Plumas National Forest issued a permit to the Department of Water Resources on November 20, 1990. The permit allowed installation, but not operation, of cloud seeding equipment in accordance with the Forest Service Regional Office decision on the request for a stay and appeal by the California Sportfishing Protection Alliance. The Department subsequently installed the equipment so that the project could operate that winter following a satisfactory decision on the appeal. Since additional information was requested by the Regional Office before allowing the project to operate, no propane was released from the tanks. Project operation would have resulted in the propane tanks being emptied by spring, with the empty tanks stored at the facilities of the propane distributor. Since the project did not operate, an alternative storage facility had to be located for storage of the tanks. The propane tanks were moved to the storage site in May and June, 1991.

Plumas County did not object to the storage location of the propane tanks as indicated in the comments. The February 22, 1991 letter from the Department's Staff Counsel, Linda Ackley, referenced by the California Sportfishing Protection Alliance (Appendix F, Exhibit C), to Mr. John McMorow, Planning Director for Plumas County, clarifies the State's immunity from local land use regulation regarding the need for County Special Use Permits for dispenser and gauge installation, and offered to meet with Plumas County representatives to discuss reimbursement to the County for costs incurred due to operation of the project.

The California Sportfishing Protection Alliance on June 4, 1991 requested the Department to comply with County zoning and permit requirements. The Department, after consulting with Plumas County, informed the California Sportfishing Protection Alliance about the State's immunity from local land use regulation, and, in addition, that the storage of tanks is allowable under Article 32, Section 9-2.3202(4) of the Timberland Production Zone requirements. This section allows non-timber production uses for the management for the use of other natural resources, which is the purpose of the cloud seeding program.

No environmental documentation is required for compliance with CEQA or NEPA since activities associated with storage of the tanks are covered as categorical exemptions as minor alterations to land. As discussed on page 95 of the Draft Supplement and page 155 of the Final Supplement, this minor change in the project will not significantly affect human populations since the storage area is remote and largely uninhabited. As required by the California State Health and Safety Code, a Hazardous Material Spill Contingency Plan was filed with the Plumas County Environmental Health Department.

Item 9. The Draft Supplement to the Final Joint EIS/EIR stated that increased mass movement and peak flows are the most probable cumulative watershed effects which could be produced by the project during a major rain on snow event. A major rain on snow event represents a worst case scenario. Both increased mass movement and increased peak flow could adversely impact fish, fish habitat and

other forms of aquatic life. Discussion of project effects on both mass movement and peak flow were presented in the Draft Supplement on pages 32 through 36. The data presented in the Draft Supplement indicated that neither mass movement rates nor peak flow will be detectably increased by the project, even under a worst case scenario. No adverse effects to fish, fish habitat, aquatic life or other beneficial uses are, therefore, projected.

The Final Joint EIS/EIR discussed potential effects to fish populations and their habitat, and other aquatic organisms. No adverse effects were anticipated from the cloud seeding project. The Department of Water Resources has collected almost a full year of preproject baseline data related to water quality, fish population, fish habitat, benthic macroinvertebrate populations, erosion, sedimentation and vegetation. In addition to the sampling identified in the monitoring plan (Appendix D of the Final Supplement), the Department has selected and sampled numerous additional streams outside the project area to be used as controls for those streams being monitored within the project area. The same parameters and sampling frequency are being employed on those control stations to more accurately identify any unforeseen effects of the cloud seeding project.

Item 10. The storm event mentioned by the appellants occurred on Last Chance Creek (a tributary to the East Branch North Fork Feather River and outside the project area) during an intense thundershower over a relatively small area during mid-summer 1990. The cloud seeding project will use propane (a refrigerant) which will only be effective during cold winter storms. The Department of Water Resources will not seed thunderstorms. Cloud seeding operations would not and could not be operational during the summer under such conditions.

The Last Chance Creek storm event during mid-summer 1990 is rated at an over one hundred year event (Terry Benoit, Forest Hydrologist, pers. comm.) and was by definition a highly uncommon event. On page 10, the Draft Supplement stated that intense summer thundershowers occur occasionally and have been documented to be a significant factor in erosion and sediment production. For this reason, erosion monitoring stations for the project are surveyed twice each year (at the time of cloud seeding dispenser installation and again at removal) to distinguish between erosion occurring during cloud seeding operations and those during non-operational periods.

Water quality suspension criteria were summarized on pages 7 and 8 of the Draft Supplement. Thorough analyses and justification of the suspension criteria were presented on pages 44 to 49 of the supplement. These analyses indicate that the suspension criteria would curtail cloud seeding during common storm events. With such conservative suspension criteria, unusual storm events, such as the one referred to by the appellants (had it occurred during the winter) would not have been seeded.

As discussed in the Draft Supplement on pages 72 to 90 and in the Final Supplement on pages 132 to 150, rather than contributing to increased runoff during rain on

snow events, additional snowpack from the cloud seeding project would absorb some of the moisture and delay the period of runoff, thus decreasing erosion from peak flow. Also, the rate of snowmelt during the spring would not be greater with increased snowpack due to cloud seeding, since the rate of meltwater production is essentially independent of the amount of snow on the ground. By increasing the snowpack, the period of snowmelt would be extended, but the snowmelt hydrograph would not be shifted. Since runoff and streamflow peaks are not increased, watershed degradation from a 10 percent increase in snowpack due to cloud seeding would not likely be detectable considering the highly variable natural runoff patterns.

In response to concerns of the appellants, the Final Joint EIS/EIR discussed flood control requirements at Lake Oroville. Most of the runoff from rainfall comes during the winter when the U. S. Army Corps of Engineers flood control requirements keep water storage in Lake Oroville low so there is space to handle flood flows. If runoff from a storm increases storage in Lake Oroville above the level allowed by the Corps, that water is released as soon as it can be done safely to make room to control the flood from the next storm. The small increment of additional runoff added by the project (about 22,400 acre-feet during a near average year of precipitation) will have no effect on flood storage operations at Lake Oroville. The small incremental increase in runoff will be metered into the lake over the extended period of spring and early summer snowmelt, during which periods water from Lake Oroville is being withdrawn for downstream beneficial uses.

The proposed flood operating criteria suggested by the Department of Water Resources and currently being reviewed by the Corps of Engineers have not as yet been approved. Lake Oroville is still being operated using established criteria. However, if the proposed changes are adopted there would be no impact from the cloud seeding project. The operating criteria proposed by the Department relate to when the reservoir is allowed to begin filling in March and is dependent on whether the basin is wet or dry. The rate at which Lake Oroville is allowed to fill will not change. If the basin is wet there is no change in criteria from what is now being used. If the basin is dry, there will be adequate space for the incremental inflow produced from cloud seeding. This project is expected to produce only a small increase (5 to 10 percent) in snowfall which will add to the spring runoff. The project will only be conducted during near average or below average precipitation years. Since the runoff from the seeding has been shown to contribute only to total flow and not peak flows, the runoff from the augmented snowpack will not increase the rate at which Lake Oroville begins to fill. Since the new criteria proposed have not changed the rate at which Lake Oroville is allowed to fill but just the date, there will be no impact by this project. The suspension criteria for the cloud seeding project are related to a generic flood reservation level, regardless of how they are established, and not a specific reservoir water level. The proposed changes will have not impact on the operation of the cloud seeding project or on altered Lake Oroville operations, if approved.

Item 11. The Plumas National Forest and the California Department of Fish and Game are responsible for implementing the Wild Trout Stream Management Plan, and are currently developing the final version of the management document. Consultation with the Department of Fish and Game regarding the cloud seeding project has taken place, both through discussions with DFG field personnel and transmittal of the Draft and Final EIS/EIR and Draft Supplement for review by the DFG Regional Office.

Item 12. This project adheres to the Forest Plan Standards and Guidelines for the Wild and Scenic River Prescription (RX-2).

Item 13. Project implementation requires an environmental analysis. The Final Joint EIS/EIR and the Draft Supplement for this project indicates little or no discernible environmental impacts resulting from this project. During the 5-year period of this project, monitoring will be used for verification. There is no requirement that this, or any other project, should be deferred since it "affects" the Lake Basin Recreation Area. The environmental analysis and documentation is the vehicle for determining this.

Item 14. This project adheres to the Plumas National Forest Forestwide Standards and Guidelines shown in the Forest Plan.

Item 15. There is no change in water yield from the prototype project. As discussed on page 48 of the Final Joint EIS/EIR, the total augmented precipitation is expected to add about 32,000 acre-feet to the project watershed during an ideal cloud seeding season of near average precipitation. Modelling of the Middle Fork Feather River watershed indicates that about 70 percent of the winter precipitation contributes to streamflow, with the remainder used in evapotranspiration. This means that approximately 22,400 acre-feet of the original 32,000 acre-foot increase will actually add to total runoff downstream of the enhancement area.

Item 16. The Department of Water Resources prepared a biological assessment of the potential for the project to adversely effect listed plant and animal species. This assessment was included in the Draft Supplement on pages 37 through 44. The biological opinion issued by U. S. Forest Service Zone Biologist Tom Ratcliff determined that this project with accompanying management recommendations will have no effect on any sensitive species, plant or animal, within the project area. Further, this project will have no effect on the PNF spotted owl viability network.

One of the management recommendations incorporated into the biological assessment requires the Department to consult with U. S. Forest Service wildlife personnel before entry into any spotted owl management area. This recommendation was included to insure that adverse impacts to nesting spotted owls were avoided. Any changes in U. S. Forest Service regional policy on spotted owls can be identified during these consultations and integrated into operations and maintenance schedules of the cloud seeding project.

State of Calif
Dept of Water Resources
Attn Mr Court Fennett
U.S. Forest Service
P.O. Box 11500
Quincy CA 95971

Oct 5, 1991

The Plumas Ski Club Inc., P.O. Box 85
Quincy, CA wishes to reply favorably
to the proposed 5 year operational test
program to enhance water yield by
augmenting snow pack to be accomplished
by cloud seeding of winter storms using
ground based dispensers, in the Lake Basin
area of the Plumas and Tahoe Nat Forests.

1. Any possibility of increasing precipitation,
especially during our extended period of below
average precipitation, should be tested to see
if the procedures used are successful, so that
these procedures can be used on a larger
scale in the future to increase precipitation
over a wider area.

2. Since cloud seeding will only be tried

during periods when the dispenser sites
are below -2°C and precipitation will fall
in the form of snow, this should not
cause any possibility of a flood threat since
~~since~~ any increased precipitation would only
increase the snow pack, thus resulting in a
later increase in run off.

3. Since it is anticipated that total
precipitation will only be increased by 5% in
the enhancement area, this again should cause
no appreciable increased run-off risk.

4. If these trials are not conducted there
is no way to say for sure whether the pro-
posed procedures will or can be successful.

The Plumas Ski Club agrees that the
trials should be conducted to see if the
proposals are feasible or not.

Very truly yours
Plumas Ski Club Inc.

P.O. Box 85
Quincy, CA. 95971

by Philip H. Intorp Co-Manager.

Oct 4, 1991

Dear Sir

I believe that we should use every means we have to start our storms. I believe that cloud seeding is a great way. Everyone wants water but give no thought to trying anything to get it and also building dams and such to keep it from going into the ocean. They are going to have to desalt the water soon.

Sincerely
Budda Bogg

OCT 8 1991

37 Inglewood Dr
Oroville, CA 95966
October 8, 1991

Mr. Court Bennett
Plumas National Forest
P O Box 11500
Quincy, CA 95971

Dear Mr. Bennett.

The attached article recently appeared in the Oroville Mercury Register. I am in favor of cloud seeding, or other viable means of increasing moisture into areas suffering through droughts. Lake Oroville, now nearly down 200 feet from crest, needs water as does all our area. I trust the seeding program will go through and I support it.

Yours truly,


Richard E. Gardner

State of California

Memorandum

Date : October 3, 1991

To : Carol Whiteside
Assistant Secretary for
Intergovernmental Relations
The Resources Agency

From : Department of Parks and Recreation

Subject: Cloud Seeding Project
U.S. Forest Service, Plumas National Forest
Supplement to the RIS
SCH #91084010

The staff of Plumas-Eureka State Park has been participating in this project and has an agreement with the Department of Water Resources to do wintertime weather monitoring from the park. One of the streams evaluated in the document, Jamison Creek, occurs largely within the park. The Department has the following comments about the RIS Supplement.

1. The water quality tests on Jamison Creek should be done near the mouth of the creek below the park, not in the park. The most unstable section of Jamison Creek is in the canyon below the park, and that is where project-related damage would be most likely.
2. The choice of 60% as the slope criterion for determining high-risk streams is misleading. Much of the Plumas-Eureka area has serious erosion problems on slopes that are 45% to 60%. Jamison Creek is in much worse condition than is indicated in the Supplement's analysis.
3. Gathering baseline data after the five-year cloud seeding test project is finished will be of little value; it should have been done before. Any stream bank instability caused by the project will continue to affect the stream for years.

Any questions about these comments should be addressed to David Nelson, Superintendent, Plumas-Eureka State Park, at (916) 836-2380.



Richard G. Rayburn, Chief
Resource Protection Division

RESPONSE TO COMMENTS FROM THE DEPARTMENT OF PARKS AND RECREATION:

The monitoring site within the State Park was selected for several reasons, including 1) the existence of previous baseline data; 2) the effects of gravel mining in the lower reaches of Jamison Creek would mask any effects produced by cloud seeding; and 3) streamflow data were available only at the Johnsville bridge site in the State Park.

Serious erosion problems can and do exist on slopes less than 60 percent. However, erosion is more likely to occur on slopes greater than 60 percent. It is misleading to suggest that because an erosion problem occurs on other than a 60 percent or greater slope that it was not included in their watershed sensitivity analysis. The specific erosion problem areas on slopes less than 60 percent that were mentioned in the comments are included in other watershed sensitivity factors, including inner gorge zone, soils having high to very high erosion potential, and landslide factors. Portions of Jamison Creek have been heavily impacted (in particular the lower reaches) due to past land management practices, but the CWE assessment indicates that the watershed as a whole is in relatively good condition and is unlikely to be adversely affected by projected land use activities in the short term. The Department of Water Resources has participated in formative meetings for the Jamison Creek CRM program, and will continue to participate. As this CRM group becomes more active, local problem areas can be defined and any needed corrective actions taken.

The Department of Water Resources has collected nearly a full year of baseline monitoring data, including data for water quality, sediments, fish populations, fish habitat, benthic macroinvertebrates, and erosion. The Department has also sampled several streams adjacent to the cloud seeding project boundaries for these same parameters. These paired or control stations will be sampled throughout the life of the project for comparison of effects both with and without the project. No streambank instability is projected to occur due to the cloud seeding project. Monitoring efforts, however, will determine if any such adverse effects occur due to the project, and the project will be modified to reduce or eliminate any such significant effects.

LIST OF PREPARERS

This supplement to the Environmental Impact Statement for the Prototype Project to Augment Snowpack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties was prepared by the California Department of Water Resources in coordination with the Plumas National Forest, and the U. S. Bureau of Reclamations Division of Atmospheric Resources Research in Denver, Colorado.

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APPENDICES

APPENDIX A - APPEAL DECISION BY THE U. S. FOREST SERVICE
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Pacific
Southwest
Region

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Reply to: 1570-1 (RWM)
91-05-00-0004
Snowpack Augmentation

Date: FEBRUARY 25, 1991

Mr. Robert Baiocchi
California Sportfishing Protection Alliance and
Friends of Plumas Wilderness
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CERTIFIED MAIL - R.R.R.

Dear Mr. Baiocchi:

On October 29, 1990, you filed a Notice of Appeal and request for stay under 36 CFR 217, of the Plumas National Forest Supervisor's September 12, 1990 decision on the Prototype Project to Augment Snowpack by Cloudseeding Using Ground Based Dispensers in Plumas and Sierra Counties.

On November 15, 1990, I granted your request for stay for release of propane from the dispensers but allowed the dispensers to be set up on the sites. Pursuant to 36 CFR 217.17(c), the stay shall remain in effect until 15 days after my appeal decision.

On January 18, 1991, I granted an extension of the appeal process to allow time for the parties involved to discuss a possible negotiated settlement of your appeal. The Forest Supervisor informs me that these negotiations have failed to produce a satisfactory settlement and she requested that I forward my decision.

I have reviewed the entire administrative record, including your written Notice of Appeal, the Forest Supervisor's November 26, 1990 transmittal letter, the Record of Decision, and the EIS/EIR. This letter constitutes my decision on your appeal.

DECISION SUMMARY

The Forest Supervisor's decision is affirmed for all issues raised except for Issues 3b, 6b, 6c, 7, 8a, and 8b. Issue 3b concerns cumulative watershed effects on water quality, channel stability and fish/aquatic resources. Issues 6b and 6c involve the biological evaluation prepared for sensitive, threatened and endangered species. Issue 7 addresses flood events. Issues 8a and 8b concern implementation of Forest standards and guidelines.

I found that Forest Supervisor did not adequately describe:

- (1) existing known data that can relate to the watershed condition and fisheries habitat of the third order streams you mentioned in your appeal.
- (2) the cumulative effects and the factors used in the cumulative watershed effects analysis on the third order drainages you mentioned in your appeal
- (3) the effects of the project on sensitive, threatened and endangered wildlife species
- (4) the effects of flooding on small streams
- (5) whether or not there are any municipal supply watersheds identified in the Forest Plan and if so the effects of the project on water quality in any such watersheds.

I am directing the Forest Supervisor to provide additional information in the areas listed above. If there are significant new circumstances or information relative to environmental concerns and bearing on proposed actions or their impacts, then a supplement to the original EIS/EIR will be required with a record of decision. I am asking the Forest Supervisor to transmit to you and me a copy of the new information and the rationale as to why a new decision is or is not required.

ISSUES

You presented your issues on the Prototype Project to Augment Snowpack by Cloudseeding Using Ground Based Dispensers in your appeal. I have consecutively numbered the issues in the order that you discussed them. Where necessary, I have divided the main issue into sub-issues to address your concerns.

Issue List

Issues or sub-issues were compiled from the Statement of Facts section of your appeal.

1. DWR is proposing to conduct a 5 year operational test program for enhancing water yield to the Oroville Facility by augmenting the snow pack in Plumas and Sierra counties by cloud seeding winter storms using ground based dispensers.
2. The No Project Alternative is grossly deficient because it does not address water transfer to Oroville from other water facilities nor adequately compare this alternative with the other alternatives.
3. The document did not properly discuss, evaluate and mitigate all of the cumulative impacts to water quality, channel stabilization and fish and aquatic resources in streams within the project area.
 - a. No pre-project site specific studies to determine the direct, indirect and cumulative effects to water quality and the stream environments.
 - b. Adverse cumulative effects from the early melting of the snowpack to landslides, channel aggradation and degradation, bank erosion, and direct effects to the fishery resources and water quality in mentioned streams was not discussed, evaluated or analyzed.
 - c. Cumulative effects to water quality and fishery habitat from soil disturbance activities in proposed salvage and green sales in the project area.
4. Effect of propane on public health.
 - a. No scientific studies which determined that emission of propane into the atmosphere would effect public health.
 - b. No air quality monitoring plan presented.
 - c. Cumulative effects to air quality were not addressed.
5. There was no pre-project water quality survey inventory for streams.
6. No pre-project studies to determine effects to wildlife species and habitat were conducted within the project area.
 - a. Conclusions from other studies are not site specific to the wildlife populations and habitat to be affected by the project.
 - b. The document does not show where there was consultation with the U.S. Fish and Wildlife Service or California Department of Fish and Game.
 - c. No biological evaluation was prepared for the project area.

7. Lack of information and data on site specific flooding events in the project area and the lack of having an inventory of streams which may flood.

8. Forest Plan Standards and Guidelines were not followed on;

- a. Municipal supply watersheds did not receive a hydrologic analysis
- b. Cumulative effects were not analyzed on third order watersheds.
- c. Special use permits need environmental studies before permit issue.

ISSUES, ALLEGATIONS and RESPONSES

Issue 1. DWR is proposing to conduct a 5 year operational test program for enhancing water yield to the Oroville Facility by augmenting the snow pack in Plumas and Sierra counties by cloud seeding winter storms using ground based dispensers.

Response:

I view this not as an issue but as a statement that describes the project. Thus, no response is needed.

Issue 2. The No Project Alternative is grossly deficient because it does not address water transfer to Oroville from other water facilities nor adequately compare this alternative with the other alternatives.

Allegation:

The final joint EIS/EIR was deficient since the Department of Water Resources (DWR) and the Plumas NF (PNF) failed to provide a comprehensive "No Project Alternative", which provides a baseline for making comparisons with all the alternatives. The final joint EIS/EIR did not rigorously explore and objectively evaluate the "No Project Alternative" nor did the document devote substantial treatment to this alternative. Had the "No Project Alternative" been written properly and adequately it would have shown that the DWR has the availability to purchase water to augment low water and drought conditions in amounts which significantly exceed the cloud seeding project, and which satisfies water demands.

Response:

I feel that the appeal discussion about buying water from the Yuba County Water Agency is not applicable for the alternatives in this EIS/EIR. This project is a basic data collection research project as stated on page 1, paragraph 3 and page 2, paragraph 2 of the final EIS/EIR. This feasibility study is to determine which method would be best in increasing snowpack accumulation. Once the method is determined in this feasibility study, a new EIS/EIR (page 2, paragraph 4 of the final EIS/EIR) would be necessary to evaluate water production alternatives. eg. cloud seeding, water purchase, vegetation removal, water conservation, etc.

Thus, I am affirming that the Forest Supervisor has adequately analyzed this alternative.

Issue 3. Cumulative effects on water quality, channel stability and fish/aquatic resources.

3a. No pre-project site specific studies to determine the direct, indirect and cumulative effects to water quality and the stream environments.

3b. Adverse cumulative effects from the early melting of the snowpack to landslides, channel aggradation and degradation, bank erosion, and direct effects to the fishery resources and water quality in mentioned streams was not discussed, evaluated or analyzed.

3c. Cumulative effects to water quality and fishery habitat from soil disturbance activities in proposed salvage and green sales in the project area.

Allegation:

3a. The EIS/EIR is deficient since pre-project site specific studies were not conducted to determine the direct, indirect, and cumulative effect to water quality and the stream environments in the target area during the testing period.

Response:

3a. In analyzing this project and possible impacts, water augmentation studies from the Sierras were utilized. These studies, which are in similar terrain to the south of this project area, have not discovered any significant alteration of water quality. Also, the amount of water generated by this project is within natural runoff rates. Therefore, there is no need to do a field investigation.

Since previous studies have not detected any water quality problems associated with snowpack augmentation and water runoff rates will remain within the historical amount, I agree with the Forest Supervisor that there should be no changes in water quality associated with this project.

Allegation:

3b. The potential adverse cumulative effects from the early melting of the snowpack to landslides, channel aggradation and degradation, bank erosion, and direct effects to the fishery resources and water quality in mentioned streams was not discussed, evaluated or analyzed.

Response:

3b. The EIR/EIS makes no reference to the amount and severity of landslides, stream channel stability or amount of soils in the high erosion hazard rating for the project area. The information you provided on pages 8 and 9 of your appeal suggests that the drainages have stability problems.

Thus, I am directing the Forest Supervisor to review the information you provided, gathering landslide, channel, soils and fisheries data that is known to exist for the area and re-evaluating the effects of early snow melt on landslide and channel stability and fisheries resource.

Allegation:

3c. The EIR/EIS failed to evaluate by analysis the cumulative effects to water quality and fishery habitat from soil disturbance activities in proposed salvage and green sales in the project area.

Response:

3c. Environmental documents for green and salvage timber sales address cumulative effects and mitigation measures used to lessen the impacts of a timber sale on water quality. The Forest Service is required to use water quality best management practices that limit the amount, location and drainage of bare ground that impacts water quality. Use of best management practices not only helps protect water quality but also helps protect fishery habitat from excess amounts of sediment.

I agree with the Forest Supervisor's analysis that there will be no significant increase in sediment discharge to affect water quality or fisheries habitat during green or salvage timber sales since these timber sales utilize best management practices. Also, rainfall intensities are not expected to increase with cloud seeding since only cold, snow producing, storms would be seeded, not the warm rain storms.

Issue 4. Effect of propane on public health.

4a. No scientific studies which determined that emission of propane into the atmosphere would effect public health.

4b. No air quality monitoring plan presented.

4c. Cumulative effects to air quality were not addressed.

Allegation:

4a. The final EIS/EIR did not contain any scientific studies which determined that emission of propane into the atmosphere will not effect public health.

Response:

4a. Public health is addressed in the EIS/EIR on page 45 paragraph 4. In this paragraph it states that "It is not likely that a cross-country skier or traveler in the area would be detrimentally exposed to higher concentrations of the released propane for the following reasons: (1) the releases will occur only during the harsh winter snow storms that are not conducive to travel; (2) the dispensers are located on exposed peaks or ridges where air is most turbulent that will rapidly mix and dilute the propane; (3) dispensing nozzles are located approximately 12 feet in the air; and (4) the propane will be released at a low rate of 2 1/2 gallons per hour".

Relative to the above discussion, I agree with the Forest Supervisor that given the amount of propane released into the atmosphere, the time of year released, and the weather conditions, there would be no public health or air quality problems associated with this project.

Thus, I affirm the Forest Supervisor's decision that there will be no health hazards associated with propane release.

Allegation:

4b. The final EIS/EIR did not implement an air quality monitoring plan.

Response:

4b. Air monitoring for propane would be an almost impossible task in the project area due to low concentration levels created by dispersal in the winter storm winds and oxidation of the propane. Also, if propane were measured, determining its significance would be difficult as there are no State or Federal air quality standards set for propane. Thus, I affirm the Forest Supervisors decision not to require an air monitoring plan.

Allegation:

4c. Cumulative effects to air quality were not addressed.

Response:

Since propane is almost impossible to measure after release from the dispensers, there would be almost nothing to measure for cumulative effects. Reference discussion in 4b.

Issue 5. There was no pre-project water quality survey inventory for streams.

Allegation:

The DWR and Forest Service did not prepare a pre-project water quality survey inventory for streams in the project area to determine the condition of water quality in all streams which may be affected by the project. Without pre-project water quality information, post project water quality monitoring is meritless since no comparative analysis can be made between pre-project and post project conditions.

Response:

Even though not every drainage in the project area has had a water quality study, the study on Nelson Creek as per appendix C-1 in the EIS/EIR is comprehensive and representative of the project area. Also there may be some other less comprehensive water and fisheries studies on other streams in the area, that were not utilized in the preparation of the EIS/EIR, that can be used for base line information.

Therefore, I am affirming the decision of the Forest Supervisor that adequate pre-project data exists that can be used as a baseline for this project.

Issue 6. No pre-project studies to determine effects to wildlife species and habitat were conducted within the project area.

6a. Conclusions from other studies are not site specific to the wildlife populations and habitat to be affected by the project.

Allegation:

6a. The EIS/EIR refers to other environmental studies, including the San Juan Ecology Project, Medicine Bow Ecology Project, Sierra Ecology Project, and the Sierra Cooperative Pilot Program. The conclusions reached from these observations are not site specific to the wildlife populations and habitat to be affected by the project in the project area.

Response:

6a. It is appropriate to refer to other environmental documents in discussing effects. This is what we call tiering or building off another document that has met public scrutiny. These other scientific studies are valuable sources of information that can be used to determine the impacts of a proposed project without having to go through extensive data collection.

Thus, in evaluating the wildlife impacts, as discussed on page 57 of the EIS/EIR, it is acceptable to compare this project with other similar projects. In doing this comparison, I agree that no adverse effects are expected to take place. An actual benefit to wildlife habitat through snowpack augmentation would occur.

Therefore, I affirm the Forest Supervisor's analysis on this subject.

Allegation:

6b. The final EIS/EIR did not contain a document which shows that DWR consulted with the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Response:

6b. As part of public scoping of a project, the U.S. Forest Service routinely solicits input from the California Department of Fish and Game and U.S. Fish and Wildlife Service. For this project, it appears that the Plumas National Forest received no written documents.

Since it is not clear what documents were received by the Department of Water Resources, I am directing the Forest Supervisor to supplement the EIS/EIR with 1) the procedure that the Department of Water Resources used in consulting with the California Department of Fish and Game and U.S. Fish and Wildlife Service and 2) any written responses obtained from these agencies.

Allegation:

6c. The EIS/EIR did not include a Biological Evaluation prepared by the Plumas NF.

Response:

A biological evaluation was conducted for sensitive, threatened and endangered plant species in the project area. The biological evaluation indicated that there were no sensitive plant populations at the dispenser sites and that alteration of the snowpack would not cause a change in sensitive plant populations.

However, it appears that there was no biological evaluation conducted for the sensitive, threatened and endangered wildlife species.

I am directing the Forest Supervisor to supplement the EIS/EIR with a biological evaluation for sensitive, threatened and endangered wildlife species in the project area as per FSM 2672.4. This evaluation will determine if snowpack augmentation will adversely effect the sensitive, threatened and endangered wildlife species or their habitat.

Issue 7. Lack of information and data on site specific flooding events in the project area and the lack of having an inventory of streams which may flood.

Allegation:

No site specific pre-project scientific studies were conducted by the DWR to determine the effects to the public and private property from flooding as an incremental result of the project. Though the suspension criteria would crease project operation, additional storms may very well lead to flooding during unseasonal early spring warming and heavy runoff.

Response:

About 60% of the area is in the snow transition zone that lends itself to producing flood runoff. Since this zone is subject to melt off during warm storms, suspension criteria (EIR/EIS, page 25-27 - Flooding and Avalanche Danger) have been developed to cease cloud seeding if snowpacks have reached their historical average water-equivalent, or if there are high intensity rains.

Monitoring of the stations can be done by telecommunications with satellite so that the snowpack and rainfall intensities and amounts can be closely monitored.

According to Appendix D-3, a normal season of 40 storms would produce about 2.3 inches of extra water. Also during any given storm, only about 0.08 inches of water is expected. This low increase in water, that is within 10% of historical average, should not be a factor in producing any historical type floods.

However, since flooding problems are a concern, the suspension criteria needs to be validated. Thus, I am directing the Forest Supervisor to supplement the EIS/EIR by determining the recurrence intervals for a storm that produces 4 inches of rain at Quincy, 5 inches of rain at La Porte, and the 60,000 cfs inflow into Lake Oroville. These data will tell if these rainfall and runoff events are extreme or common. If they are a common occurrence, then the flooding concern should be alleviated. If these events are extreme events, then the Forest Supervisor should evaluate the appropriateness of the suspension criteria.

Issue 8. Forest Plan Standards and Guidelines were not followed;

- 8a. Municipal supply watersheds did not receive a hydrologic analysis.
- 8b. Cumulative effects were not analyzed on third order watersheds.
- 8c. Special use permits need environmental studies before permit issue.

Allegation:

8a. Under Municipal-Supply Watersheds on page 4-40 of the Forest Plan, the DWR was required to perform hydrologic surveys and analyses, and thereafter monitor for compliance with BMP's when planning projects within these watersheds.

Response:

8a. Since the EIS/EIR does not mention domestic water uses, I am directing the Forest Supervisor to supplement the EIS/EIR by reviewing the Forest Land Management Plan to determine if any municipal supply watersheds are in the project area. If there are municipal supply watersheds present, then the Forest Supervisor will need to discuss how this project meets the Forest Plan standards and guidelines.

Allegation:

8b. Under Watershed Protection on pages 4-41 of the Forest Plan, the DWR was required at the project planning level to assess cumulative watershed impacts within 3rd order or smaller watersheds and to defer activities when the cumulative disturbance is at or near a threshold of causing damage.

Response:

8b. According to the Forest Plan, the third order watersheds you mentioned in your appeal should have been analyzed for cumulative watershed effects. This analysis would tie in with issue 3b. The information on streams you mention on pages 8 and 9 needs to be verified. The severity of the channel instability and factors leading to the watershed being near threshold of concern need to be identified.

Management activities may occur in a watershed which is near or at the threshold of concern provided there is more scrutiny given to what is causing the problem, what watershed improvement measures can be applied to improve the watershed, and what mitigation measures can be used in the project to lessen watershed impacts.

Thus, I am directing the Forest Supervisor to supplement the EIS/EIR with a cumulative watershed analysis on the streams you mentioned in your appeal. It is important to know if any watersheds are over threshold, and if the incremental effect added by this project will adversely effect stream channel stability, landslides, bank failures, channel aggradation or degradation, or fish habitat. For watersheds that are over threshold, I am asking that sensitive areas be identified for watershed improvement and that mitigation measures be identified which would bring the watersheds to within the threshold of concern.

Allegation:

8c. The Lands Section, page 4-50 of the Forest Plan, requires an applicant for special use permits to furnish environmental studies. The DWR did not conduct site specific pre-project scientific studies to determine direct, indirect and cumulative effects to the environments, but simply conducted "seat of the pants" comments and claimed no significant effects would occur to the environment.

Response:

8c. The direction in the Forest Plan for special use permits requires the applicant to make an environmental study. The applicant and the Forest have met this requirement by producing this EIS/EIR.

DECISION

The Forest Supervisor's decision is affirmed for all issues except Issues 3b, 6b, 6c, 7, 8a, and 8b. I find that the EIS/EIR should have evaluated the third order watersheds for channel stability and cumulative effects, the probability of rain and runoff events listed in the suspension criteria, hydrologic analysis for municipal supply watersheds in the project area, and a biological evaluation for sensitive, threatened and endangered species.

Mr. Robert Baiocchi

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I am directing the Forest Supervisor to provide additional information in the areas identified above. If there are significant new circumstances or information relative to environmental concerns and bearing on proposed actions or their impacts, then a supplement to the original EIS/EIR will be required with a record of decision. I am asking the Forest Supervisor to transmit to you and me a copy of the new information and the rationale as to why a new decision is or is not required. I am committed to expediting my review of the information and analyses provided by the Forest Supervisor.

I am forwarding a copy of this letter and the decision document to the Chief of the Forest Service who will notify you whether he will review my decision at his discretion in accordance with the procedures described in 36 CFR 217.17.

Sincerely,

/s/ DAVID M. JAY

DAVID M. JAY
Reviewing Officer
Deputy Regional Forester

cc:
Forest Supervisor, Plumas NF
Chief

APPENDIX B. CURRENT AND PROJECTED EQUIVALENT ROADED ACRE ASSESSMENTS

Table B-1. Current Equivalent Roaded Acre Assessment for the Squirrel Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	195.8	1.00	195.8	1.00	195.8
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands					
1989	160.0	0.20	32.0	0.97	31.0
1990	40.0	0.20	8.0	0.99	7.9
Mining	1.0	1.00	1.0	1.00	1.0
Grazing	100.0	0.01	1.0	1.00	1.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	<u>4721.2</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	5218.0				236.7
Existing ERA Values					
Unit F	2100.0				6.0
Above Subtotal	5218.0				4.5
Total	7318.0			ERA	4.9
				TOC	12.0
				% of TOC	37.4

Table B-2. Current Equivalent Roaded Acre Assessment for the Greenhorn Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	166.5	1.00	166.5	1.00	166.5
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands					
1982	405.0	0.20	81.0	0.50	40.5
1982	405.0	0.20	81.0	0.50	40.5
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	300.0	0.05	3.0	1.00	3.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	<u>2349.5</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	3626.0				250.7
Existing ERA Values					
Unit E	1450.0				8.5
Unit D	1660.0				4.0
Above Subtotal	3626.0				6.9
Total	6736.0			ERA	6.5
				TOC	12.0
				% of TOC	54.2

Table B-3. Current Equivalent Roaded Acre Assessment for the Estray Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	202.5	1.00	202.5	1.00	202.5
Timber Harvest					
Public Lands					
Salvage	207.0	0.06	12.4	0.97	12.0
Private Lands					
1989	150.0	0.20	30.0	0.97	29.1
1990	175.0	0.20	35.0	0.99	34.7
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	0.0	0.00	0.0	0.00	0.0
Wildfire (private)	112.0	0.40	44.8	0.97	43.5
Wildfire (public)	380.0	0.15	57.0	0.97	55.3
Undisturbed	<u>5085.0</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	6109.0				377.1
Existing ERA Values					
Subwatershed A	1550.0				7.0
Subwatershed B+C	1980.0				3.0
Above Subtotal	6109.0				6.2
Total	9639.0			ERA	5.7
				TOC	10.0
				% of TOC	57.0

Table B-4. Current Equivalent Roaded Acre Assessment for the Willow Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	475.2	1.00	475.2	1.00	475.2
Timber Harvest					
Public Lands					
1986	454.0	0.35	158.9	0.96	152.5
1986	29.0	0.20	5.8	0.90	5.2
Private Lands					
1984	13.0	0.20	2.6	0.72	1.9
1986	598.0	0.20	119.6	0.83	99.2
1989	210.0	0.20	42.0	0.97	40.7
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	1200.0	0.02	24.0	1.00	24.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	<u>10641.0</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	13145.0				798.7
Existing ERA Values					
Humbug Salvage	853.0				8.5
Above Subtotal	13145.0				6.0
Total	13998.0			ERA	6.2
				TOC	11.0
				% of TOC	56.3

Table B-5. Current Equivelent Roaded Acre Assessment for the Nelson Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	346.2	1.00	346.2	1.00	346.2
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands	0.0	0.00	0.0	0.00	0.0
Mining	12.0	1.00	12.0	1.00	12.0
Grazing	0.0	0.00	0.0	0.00	0.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	0.0	0.00	0.0	0.00	0.0
Subtotal	26828.0				358.2
Existing ERA Values					
Fish Creek	680.0				2.0
Coldwater Creek	1340.0				2.5
Gambini Creek	190.0				2.0
Poorman Creek	2058.0				7.2
Unit O	135.0				3.0
Unit P	170.0				12.0
Unit Q	300.0				1.0
Unit R	300.0				7.5
Gambini E	640.0				6.0
Above Subtotal	26828.0				1.3
Total	32641.0			ERA	2.0
				TOC	6.0
				% of TOC	33.3

Table B-6. Current Equivelent Roaded Acre Assessment for the Poplar Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	155.2	1.00	155.2	1.00	155.2
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands	0.0	0.00	0.0	0.00	0.0
Mining	35.0	1.00	35.0	1.00	35.0
Grazing	640.0	0.01	6.4	1.00	6.4
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	4543.8	0.00	0.0	0.00	0.0
Subtotal	5374.0				196.6
Existing ERA Values					
Unit AA	660.0				1.0
Unit E	590.0				0.0
Unit W	380.0				1.0
Unit I	530.0				13.0
Unit J	200.0				0.5
Unit K	680.0				4.0
Unit F	240.0				0.0
Unit G	680.0				0.0
Above Subtotal	5374.0				3.7
Total	9334.0			ERA	3.3
				TOC	12.0
				% of TOC	27.5

Table B-7. Current Equivelent Roaded Acre Assessment for the Jamison Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	470.7	1.00	470.7	1.00	470.7
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands					
1981	110.0	0.20	22.0	0.50	11.0
Mining	20.0	1.00	20.0	1.00	20.0
Grazing	450.0	0.10	45.0	1.00	45.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	<u>1050.7</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	18092.0				525.7
Existing ERA Values					
Unit L	660.0				3.0
Unit M	730.0				10.0
Unit N	530.0				1.5
Above Subtotal	18092.0				2.9
Total	20012.0			ERA	3.1
				TOC	9.0
				% of TOC	34.4

Table B-8. Current Equivelent Roaded Acre Assessment for the Graeagle Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	135.4	1.00	135.4	1.00	135.4
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands	0.0	0.00	0.0	0.00	0.0
Mining	5.0	1.00	5.0	1.00	5.0
Grazing	640.0	0.02	12.8	1.00	12.8
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	<u>780.4</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	5814.0				153.2
Total	5814.0			ERA	2.6
				TOC	12.0
				% of TOC	21.6

Table B-9. Current Equivelent Roaded Acre Assessment for the Sulphur Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	664.4	1.00	664.4	1.00	664.4
Timber Harvest					
Public Lands					
	86.0	0.40	34.4	0.87	29.9
	150.0	0.20	30.0	0.87	26.1
	21.0	0.40	8.4	0.94	7.9
Private Lands					
1981	15.0	0.20	3.0	0.68	2.0
1981	598.0	0.20	119.6	0.68	81.3
1984	40.0	0.40	16.0	0.90	14.4
1984	61.0	0.20	3.2	0.80	2.6
1984	510.0	0.20	102.0	0.80	81.6
Mining	35.0	1.00	35.0	0.80	28.0
Grazing	3290.0	0.02	290.3	1.00	290.3
Wildfire	0.0	0.00	0.0	0.00	0.0
Undisturbed	8455.6	0.00	0.0	0.00	0.0
Subtotal	13926.0				1228.5
Existing ERA Values					
Unit A	960.0				4.5
Unit B	340.0				9.5
Unit C	710.0				5.5
Unit D	460.0				8.5
Unit E	1110.0				7.0
Unit F	300.0				6.5
Unit G	470.0				6.0
Unit H	870.0				7.0
Unit S-A	1900.0				8.0
Unit S-B	470.0				9.0
Unit S-C	700.0				3.0
Unit S-D	275.0				8.0
Above Subtotal	13926.0				8.8
Total	22491.0			ERA	8.0
				TOC	9.0
				% of TOC	88.8

Table B-10. Projected Equivelent Roaded Acre Assessment for the Squirrel Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	195.8	1.00	195.8	1.00	199.3
Timber Harvest					
Public Lands	254.0	0.35	88.9	1.00	88.9
	633.3	0.20	126.6	1.00	126.6
Private Lands					
1989	160.0	0.20	32.0	0.65	20.8
1990	40.0	0.20	8.0	0.80	6.4
Projected	3156.0	0.075	118.8	1.00	118.8
Mining	1.0	1.00	1.0	1.00	1.0
Grazing	100.0	0.10	10.0	1.00	10.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	5218.0				571.8
Projected ERA Values					
Subwatershed F	2100.0				6.0
Above Subtotal	5218.0				10.9
Total	7318.0			ERA	9.5
				TOC	10.0
				% of TOC	95.0

Table B-11. Projected Equivelent Roaded Acre Assessment for the Greenhorn Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	166.5	1.00	166.5	1.00	168.6
Timber Harvest					
Public Lands	114.0	0.35	39.9	1.00	39.9
	283.3	0.20	56.7	1.00	56.7
Private Lands					
1982	405.0	0.20	81.0	0.30	24.3
1982	405.0	0.20	81.0	0.30	24.3
Projected	2151.0	0.075	80.9	1.00	80.9
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	300.0	0.10	30.0	1.00	30.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	3626.0				424.7
Existing ERA Values					
Subwatershed E	1450.0				8.5
Subwatershed D	1660.0				4.0
Above Subtotal	3626.0				11.7
Total	6736.0			ERA	9.1
				TOC	10.0
				% of TOC	91.0

Table B-12. Projected Equivelent Roaded Acre Assessment for the Estray Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	203.5	1.00	203.5	1.00	203.5
Timber Harvest					
Public Lands	33.0	0.35	11.6	1.00	11.6
	83.3	0.20	16.7	1.00	16.7
Salvage	207.0	0.06	12.4	0.65	8.1
Private Lands					
1989	150.0	0.20	30.0	0.65	19.5
1990	175.0	0.20	35.0	0.70	24.5
Projected	5177.0	0.038	194.9	1.00	194.9
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	0.0	0.00	0.0	0.00	0.0
Wildfire	112.0	0.40	44.8	0.60	26.9
	<u>380.0</u>	0.15	57.0	0.60	<u>34.2</u>
Subtotal	6109.0				539.9
Projected ERA Values					
Subwatershed A	1550.0				7.0
Subwatershed B+C	1980.0				3.0
Above Subtotal	6109.0				8.8
Total	9639.0			ERA	7.3
				TOC	10.0
				% of TOC	73.0

Table B-13. Projected Equivelent Roaded Acre Assessment for the Willow Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	475.2	1.00	475.2	1.00	475.2
Timber Harvest					
Public Lands					
1986	454.0	0.35	158.9	0.68	108.1
1986	29.0	0.20	5.8	0.50	2.9
Private Lands					
1984	13.0	0.20	2.6	0.48	1.2
1986	598.0	0.20	119.6	0.52	62.2
1989	210.0	0.20	42.0	0.70	29.4
Projected	3883.0	.038	146.2	1.00	146.2
Mining	0.0	0.00	0.0	0.00	0.0
Grazing	1200.0	0.10	120.0	1.00	120.0
Wildfire	<u>0.0</u>	0.00	0.0	0.00	<u>0.0</u>
Subtotal	13145.0				945.2
Projected ERA Values					
Humbug Salvage	853.0				8.5
Above Subtotal	13145.0				7.2
Total	13998.0			ERA	7.3
				TOC	9.0
				% of TOC	81.1

Table B-14. Projected Equivalent Roaded Acre Assessment for the Nelson Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	346.6	1.00	346.6	1.00	346.6
Timber Harvest					
Public Lands	30.0	0.35	10.5	1.00	10.5
	75.0	0.20	15.0	1.00	15.0
Private Lands	553.9	0.038	20.9	1.00	20.9
Mining	12.0	1.00	12.0	1.00	12.0
Grazing	0.0	0.00	0.0	0.00	0.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	26828.0				405.0
Projected ERA Values					
Fish Creek	680.0				2.0
Coldwater Creek	1340.0				2.5
Gambini Creek	190.0				2.0
Poorman Creek	2058.0				7.2
Subwatershed O	135.0				3.0
Subwatershed P	170.0				12.0
Subwatershed Q	300.0				1.0
Subwatershed R	300.0				7.5
Gambini East	640.0				6.0
Above Subtotal	26828.0				1.5
Total	32641.0			ERA	2.1
				TOC	8.0
				% of TOC	26.3

Table B-15. Projected Equivalent Roaded Acre Assessment for the Poplar Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	156.6	1.00	156.6	1.00	156.6
Timber Harvest					
Public Lands	90.0	0.35	31.5	1.00	31.5
	225.0	0.20	45.0	1.00	45.0
Private Lands	5239.8	0.038	197.3	1.00	197.3
Mining	35.0	1.00	35.0	1.00	35.0
Grazing	640.0	0.10	64.0	1.00	64.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	5374.0				529.4
Projected ERA Values					
Subwatershed AA	660.0				1.0
Subwatershed E	590.0				0.0
Subwatershed W	380.0				1.0
Subwatershed I	530.0				13.0
Subwatershed J	200.0				0.5
Subwatershed K	680.0				4.0
Subwatershed F	240.0				0.0
Subwatershed G	680.0				0.0
Above Subtotal	5374.0				9.9
Total	9334.0			ERA	6.8
				TOC	10.0
				% of TOC	68.0

Table B-16. Projected Equivelent Roaded Acre Assessment for the Jamison Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	470.7	1.00	470.7	1.00	470.7
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands					
1981	110.0	0.20	22.0	0.20	4.4
Projected	935.9	0.038	35.2	1.00	35.2
Mining	20.0	1.00	20.0	1.00	20.0
Grazing	450.0	0.10	45.0	1.00	45.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	18092.0				575.3
Projected ERA Values					
Subwatershed L	660.0				3.0
Subwatershed M	730.0				10.0
Subwatershed N	530.0				1.5
Above Subtotal	18092.0				3.1
Total	20012.0			ERA	3.3
				TOC	9.0
				% of TOC	36.7

Table B-17. Projected Equivelent Roaded Acre Assessment for the Graeagle Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	135.4	1.00	135.4	1.00	135.4
Timber Harvest					
Public Lands	0.0	0.00	0.0	0.00	0.0
Private Lands	795.6	0.038	30.0	1.00	30.0
Mining	5.0	1.00	5.0	1.00	5.0
Grazing	350.0	0.10	35.0	1.00	35.0
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	5814.0				205.4
Total	5814.0			ERA	3.5
				TOC	10.0
				% of TOC	35.0

Table B-18. Projected Equivelent Roaded Acre Assessment for the Sulphur Creek Watershed

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Projected ERA Value
Roading	664.4	1.00	664.4	1.00	664.4
Timber Harvest					
Public Lands					
	86.0	0.40	34.4	0.57	19.6
	150.0	0.20	30.0	0.35	10.5
	21.0	0.40	8.4	0.73	6.1
Private Lands					
1981	15.0	0.20	3.0	0.20	0.6
1981	598.0	0.20	119.6	0.20	23.9
1984	40.0	0.40	16.0	0.67	10.7
1984	61.0	0.20	3.2	0.57	1.8
1984	510.0	0.20	102.0	0.57	58.1
Projected	10468.9	0.038	394.2	1.00	394.2
Mining	35.0	1.00	35.0	1.00	35.0
Grazing					
Public Lands	2400.0	0.05	120.0	1.00	120.0
Private Lands	878.6	0.10	87.9	1.00	87.9
Wildfire	0.0	0.00	0.0	0.00	0.0
Subtotal	13926.0				1432.8
Existing ERA Values					
Subwatershed A	960.0				4.5
Subwatershed B	340.0				9.5
Subwatershed C	710.0				5.5
Subwatershed D	460.0				8.5
Subwatershed E	1110.0				7.0
Subwatershed F	300.0				6.5
Subwatershed G	470.0				6.0
Subwatershed H	870.0				7.0
Subwatershed S-A	1900.0				8.0
Subwatershed S-B	470.0				9.0
Subwatershed S-C	700.0				3.0
Subwatershed S-D	275.0				8.0
Above Subtotal	13926.0				10.2
Total	22491.0			ERA	8.9
				TOC	9.0
				% of TOC	98.9

Table B-19. Projected Equivalent Roaded Acre Assessment for the Long Valley Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	0.6	1.00	0.6	1.00	0.6
Timber Harvest					
Public	40.0	0.35	14.0	1.00	14.0
	100.0	0.20	20.0	1.00	20.0
Private	<u>4594.0</u>	0.03765	172.9	1.00	<u>172.9</u>
Subtotal	4734.6				207.5
Existing ERA Values					
Subwatershed A	1660.0				10.0
Subwatershed B	1870.0				16.0
Subwatershed C	690.0				8.0
Subwatershed D	580.0				11.5
Subwatershed E	780.0				11.0
Subwatershed F	1470.0				9.4
Lower Watershed	2880.0				9.5
Above Subtotal	4734.6				207.5
Total	14664.6			ERA	12.6
				TOC	12.0
				% of TOC	104.9

Table B-20. Projected Equivalent Roaded Acre Assessment for the Consignee Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Roading	30.0	1.00	3.0	1.00	30.0
Timber Harvest					
Public Lands	49.2	0.03765	1.85	1	1.85
1986	12.0	0.35	4.2	0.80	3.4
1986	8.0	0.20	1.6	0.80	1.3
1990	210.0	0.25	52.5	0.60	31.5
1990	67.0	0.65	43.6	0.47	20.4
Private Lands	0.0	0.00	0.0	0.00	0.0
Mining	10.0	0.30	3.0	1.00	3.0
Grazing	0.0	0.00	0.0	0.00	0.0
Wildfire	190.0	0.20	38.0	0.40	15.2
	<u>217.0</u>	0.50	109.0	0.40	<u>43.6</u>
Subtotal	1330.0				150.3
Total	1330.0			ERA	11.3
				TOC	12.0
				% of TOC	94.2

Table B-21. Projected Equivelent Roaded Acre Assessment for the Little Long Valley Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Timber Harvest					
Private	<u>2720.7</u>	0.03765	102.4	1.00	<u>102.4</u>
Subtotal	<u>2720.7</u>				<u>102.4</u>
Existing ERA Values					
Subwatershed A	1260.0				9.5
Subwatershed B	690.0				10.6
Subwatershed C	670.0				10.0
Lower Watershed	1160.0				8.6
Above Subtotal	<u>2720.7</u>				<u>102.4</u>
Total	6500.7			ERA	9.8
				TOC	12.0
				% of TOC	81.6

Table B-22. Projected Equivelent Roaded Acre Assessment for the Rattlesnake Creek Watershed.

Land Use Activity	Area (acres)	Land Disturbance Coefficient	ERA Value	Recovery Coefficient	Current ERA Value
Timber Harvest					
Private Lands	<u>543.7</u>	0.03765	20.5	1.00	<u>20.5</u>
Subtotal	<u>543.7</u>				<u>20.5</u>
Existing ERA Values					
Subwatershed 53	1050.0				7.5
Subwatershed 54	1070.0				9.5
Above Subtotal	<u>543.7</u>				<u>20.5</u>
Total	2663.7			ERA	8.6
				TOC	12.0
				% of TOC	71.6

APPENDIX C - RAIN ON SNOW MODEL DESCRIPTION

This information addresses the concerns made in the appeal (Item 3b) relating to the direct, indirect and cumulative effects of snowpack augmentation (assumed 10 percent increase), if early snowmelt (assumed to be caused by warm rain on snow) occurred, on landslides, channel aggradation and degradation, and bank erosion. The information below is in addition to what was provided on pages 48 and 49 of the Final EIS under Section IV-F-7, Runoff and Floods.

A large body of information exists about the hydrologic response of a rain on snow event (Bergman 1983, Kattleman 1986). As stated by Kattleman "The rate of meltwater production in years of average snowpacks is essentially independent of the amount of snow on the ground. Similarly, rain on snow events, which are responsible for the highest peak flows and occasional mass movements, would be unaffected by changes in snowpack depth due to weather modification. Only in the transient snow zone would small changes in snowpack depth affect erosion processes. Here if weather modification resulted in a thin snow cover on ground that would otherwise have been bare, melt during rainfall would lead to greater runoff than would have occurred naturally. Conversely, the shallow snow cover made possible by weather modification would protect the soil from raindrop impact and minimize surface erosion." As these results were determined for the American and Yuba basins it is necessary to determine if the same conclusions hold for the Feather basin and specifically within the projected target area. Modeling for the Feather basin showed no increase in peak flow at different initial snow depths for 15 and 50-year storm events. The following data is presented in this regard.

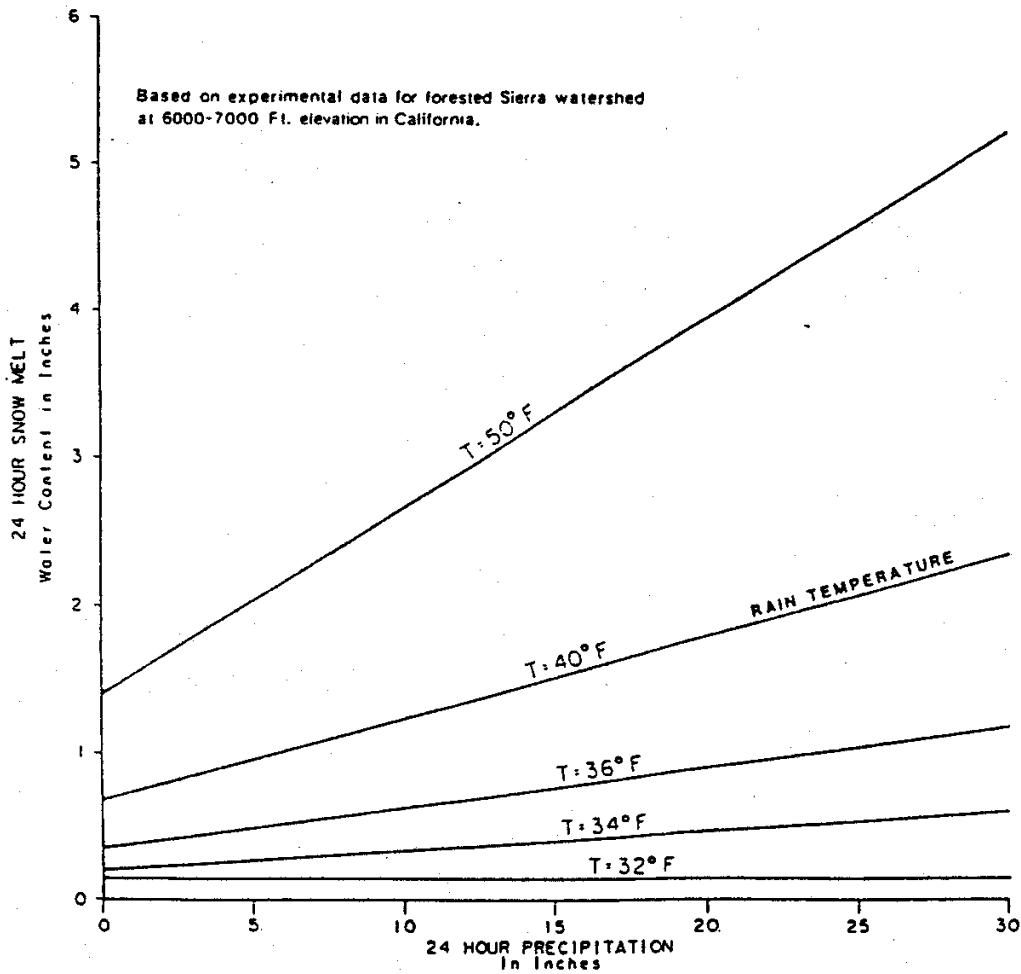
Rain on Snow Case Studies Within the Proposed Target Area

It takes a large amount of energy to melt snow. The U. S. Army Corps of Engineers has developed some empirical equations based upon conditions in the Central Sierra. These equations take into account rain, wind and heat from the ground in generating melt. Figure 15 shows 24 hour snowmelt for a forested area with rain ranging in temperature from 32 F to 50 F. For example, 10 inches of rain falling at 40 F will result in about 1.2 inches of water being released from the pack. Note that the figure also shows that with no rain falling, a temperature of 40 F will melt approximately 0.7 inches of snow water equivalent.

Both extensive research at the Central Sierra Snow Lab and field data from automated snow sensors (snow water content from snow pillows which is telemetered back to the Department of Water Resources in Sacramento) data indicate that rain on snow compresses and wets the snowpack but melts very little snow in comparison to the amount of rain that falls. For elevations above 5,500 feet, where the seasonal snowpack resides, data collected from rain on snow events such as the February 1986 and the March 1989 storms show the following.

February 1986 Case Study - During the middle of February 1986, a series of storms

Figure 15. Snowmelt versus rainfall and temperature based on experimental data for forested Sierra watersheds at 6,000 to 7,000 foot elevations.



SOURCE: STEIN BUER, HYDROLOGY AND WATER SUPPLY BRANCH, D.W.R.

passed through the Sierra Nevada, producing after ten days of precipitation, widespread flooding. This storm is significant in that it was preceded by a somewhat below normal precipitation season to that point. This would be typical of a year when cloud seeding would have been conducted. The period of precipitation began late on February 11 and continued through February 20. However seeding would have been suspended on February 11 had this cloud seeding program been in existence due to the prediction of excessive rainfall (the Bureau of Reclamation's Sierra Project being conducted at this time in the American River basin was suspended at noon on the 11th because of a prediction of 4 to 8 inches of precipitation over the next 48 hours). Given that the snow line was near or above 5,000 feet for these storms, pre-project criteria set-up for seed/no-seed decision making would not have been met.

Figures 16, 17 and 18 are graphs showing precipitation, snowpack water content and temperature (when available) for three stations in the Feather drainage. The two highest elevation stations, Gold Lake and Grizzly Ridge are in the proposed target area. Four Trees at 5,150 feet is on the west side of the Sierra and also has a much wetter climate than any station in the target area but is used as an example of elevations within the transient snow zone. Moving from west to east, Figure 16 shows data for Four Trees for this ten day period. The water equivalent of the pack started out at 1.5 inches on the 11th. The pack gained 2.5 inches of water during a fairly cold rain event in the first 36 hours. After a 24 hour break ten inches of rain fell at temperatures between 35 to 40 °F yielding about 1.5 inches of water from the pack as Figure 15 would suggest. The major rainfall period began about 125 hours into the storm. Almost 30 inches of rain fell in a two day period. This melted the remaining 2 inches of water equivalent snow, again as Figure 15 would suggest.

Several important points must be made when discussing this data. First, only the original 1.5 inches of water equivalent in the pack as of February 11 is relevant to the discussion of snow augmentation and its impact. Assuming that the project would have produced an additional 10 percent increase in water content in the pack, only 0.15 inches of this 1.5 inches would have been due to seeding; much less than the 45 inches of rain that fell. It took 10 hours for the original 1.5 inches to melt or wash off. Therefore there would have been a contribution to the rise in the streamflow from seeding, but at a ratio of 0.15 inches/12 inches rain (that melted it) or 1.25 percent contribution. Secondly, this site is not truly representative of the target area in that Four Trees is much wetter and thus the transient snow zone in the proposed target area may have had less snow water equivalent and certainly, as will be shown in the following figures, much less rainfall to melt the snow.

Figure 17 shows the same information as Figure 16 but for Gold Lake, a site in the extreme western edge of the proposed target area and to the east of the Sierra crest. Note here the snowpack water equivalent started out at about 28 inches. As several major precipitation events occurred in the next ten days at temperatures near 40 °F, the snowpack water equivalent increased or remained constant. By the end of the storm period the snowpack water equivalent had increased to almost 42 inches.

Figure 16. Hourly precipitation and temperature data collected at Four Trees, Cal. and LaPorte, Cal. respectively during the period of February 11 through 20, 1986.

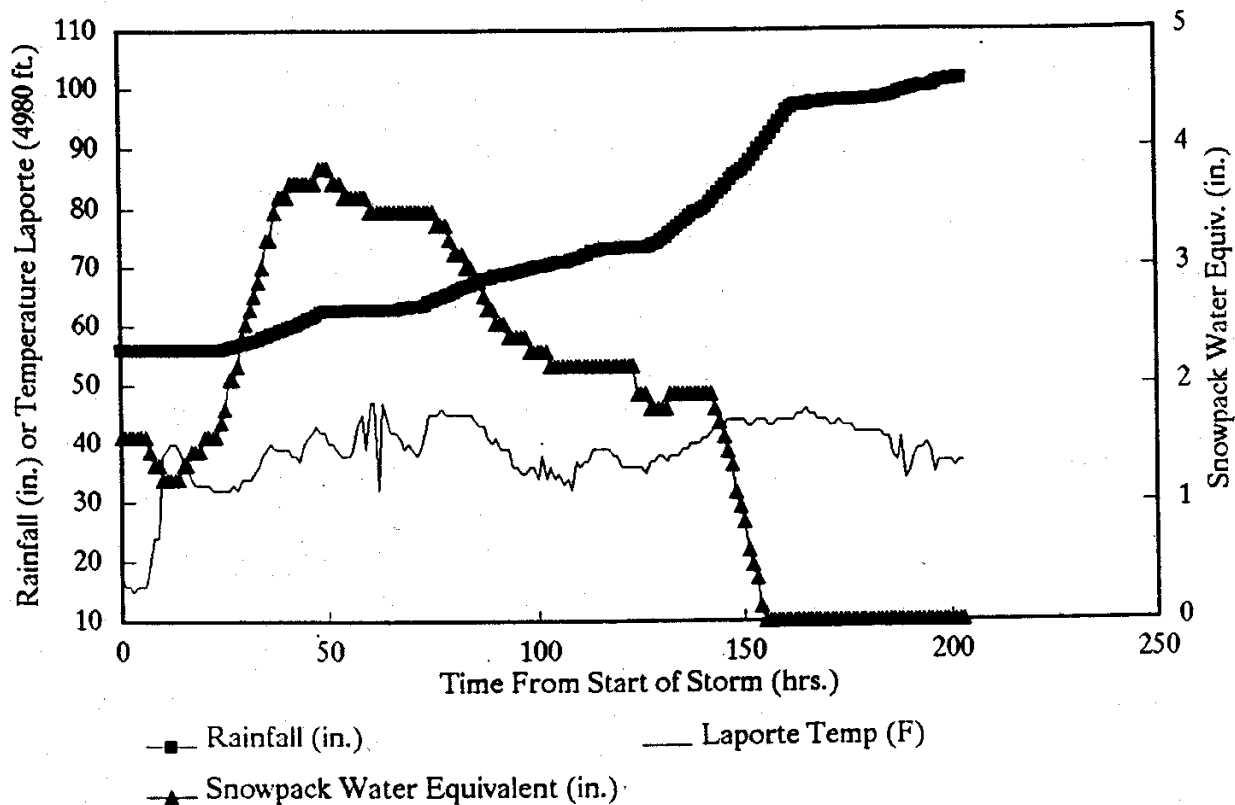


Figure 17. Hourly precipitation and temperature data collected at Gold Lake, Cal. for the period of February 11 through 20, 1986.

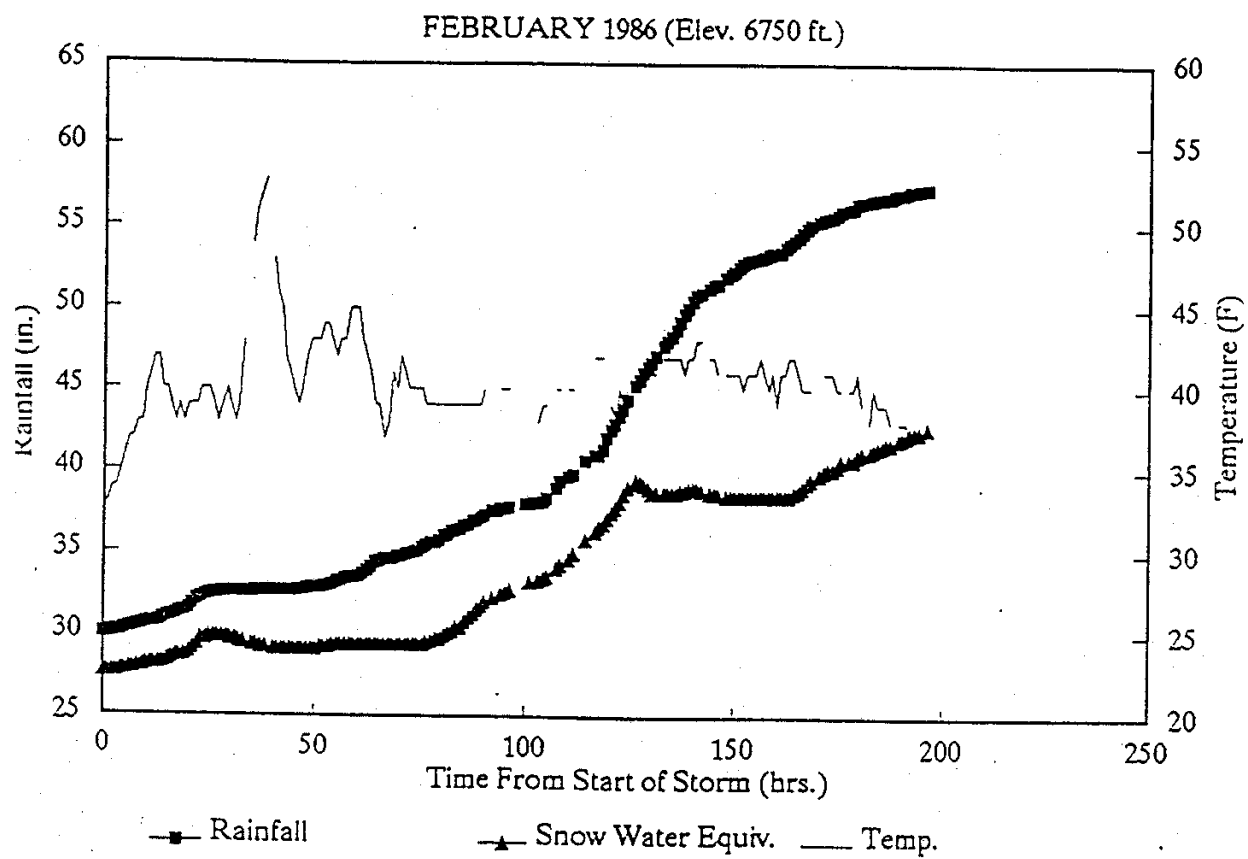
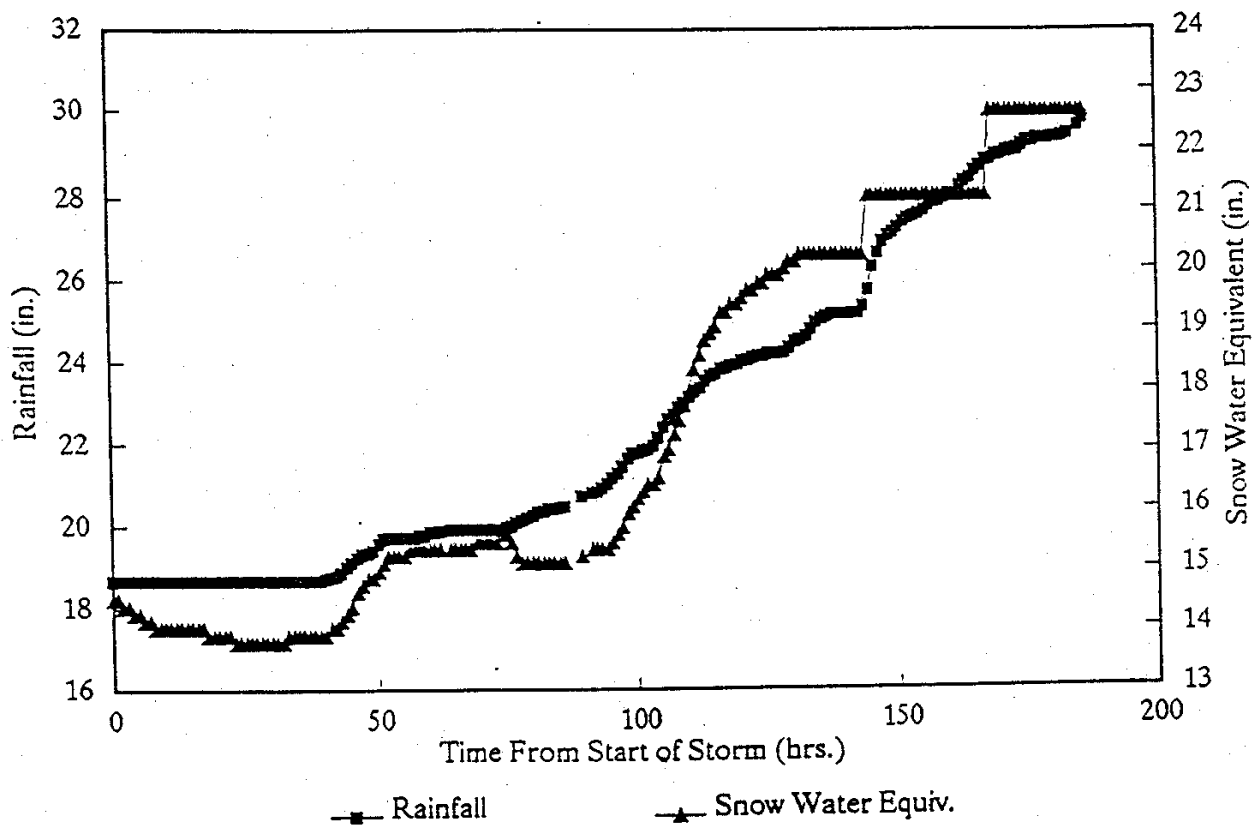


Figure 18. Hourly precipitation data collected at Grizzly Ridge Cal. for the period of February 11 through 20, 1986. Snow water equivalent data from the snow pillow for the last 48 hours are interpolated daily amounts.



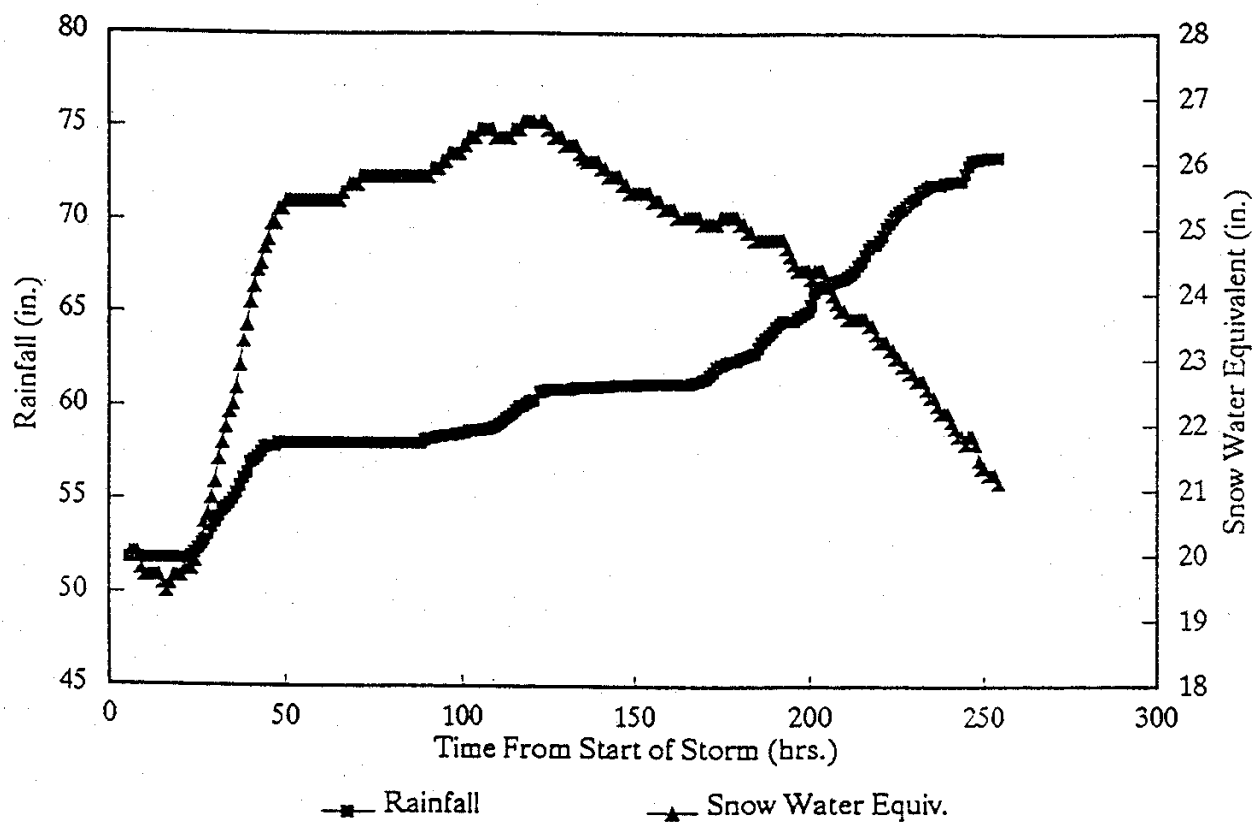
First note that the storm produced about half the precipitation at Gold Lake as occurred at Four Trees. Secondly, the pack retained about half of the precipitation that fell. It is not possible from this data to say that all the precipitation that fell at Gold Lake was rain. However it is fairly certain that from 125 hours to about 160 hours into the storm the precipitation that fell was all rain. During this period the snowpack water equivalent was unchanged even though 12 inches of rain fell. Again, this data substantiates the results of Kattleman that the runoff for a rain on snow event is independent of the snowpack water equivalent and the pack may in fact reduce peak flows by spreading the runoff from the rain over a longer time period.

Figure 18 shows similar data for Grizzly Ridge, a high elevation site on the east edge of the proposed target area. The snowpack water equivalent began at 17 inches, 1.7 inches of which might have been contributed by cloud seeding had it been conducted up to this time. The early part of this storm produced snow and increased the snowpack water equivalent from 17 inches to 19.5 inches water equivalent. During the confirmed rain event (Department of Water Resources staff was working on the Sierra crest during a portion of this period), between 150 and 175 hours, the snow pillow information was unfortunately erroneous as the sensor stuck at 20.3 inches. However, manual snow core measurements made around the pillow showed 74.8 inches snow depth and 28.5 inches of snowpack water equivalent. Thus Figure 18 shows interpolated daily data rather than hourly data through this period. Daily values were derived based on the rate of precipitation. At this location, the pack apparently gained water throughout the entire storm. Due to the lack of hourly data during a critical time in the storm not much more will be said for this site.

March 1989 Case Study - The second case is for March 1989. Again up to this point in the precipitation season, amounts of snow were well below normal. Thus cloud seeding would have been conducted up to the beginning of this event and most likely have continued through the first 48 hours of the storm given the very dry watershed and low snow levels. During the first 11 days in March of 1989, Four Trees (5,150 feet elevation), had 21.6 inches of precipitation, 6 inches of which fell as snow during March 1 through 2 (Figure 19). The snowpack had a water equivalent of 20 inches on March 1. By March 5 the snowpack water equivalent was 27 inches. Table 14 shows the 24 hours observed rainfall and snowmelt at Four Trees, along with the predicted snowmelt that would be expected based on Figure 15. Note that Figure 15 shows that without any rainfall, a 45 F air temperature for 24 hours will melt 1 inch of water equivalent snowpack. Therefore without any rain at all, had the air temperature remained at 45 F for the five days, 5 inches of water would have been removed. The rain yielded only an additional 1 inch of water from the pack. Also note that it took 24 hours to add 5.44 inches of water to the pack but 5 days to melt it out even with 12.4 inches of rain falling. Thus the pack, although not slowing the rate of rainfall through the pack, did not rapidly contribute the additional water in the pack.

Assuming seeding had been conducted for all storms up to March 7, as much as 2.7

Figure 19. Hourly precipitation measurements made at Four Trees, Cal. for the period of March 1 through 11, 1989.



inches of the maximum water equivalent of 27 inches could have been produced by seeding. As approximately 20 percent of the snowpack water content was removed from the pack during the last 5 days of the storm, seeding might have contributed 20 percent of 2.7 inches or 0.54 inches. This compares to the 12.4 inches of rainfall plus the 4.7 inches of natural snowmelt water equivalent or 0.54/17.1 or a 3 percent contribution from seeding to the total amount of water produced during this event.

Table 14. Observed versus Model Predicted Snowmelt (from Figure 15 at T=45 F)

DATE (Ending Midnight)	24 hr Four Trees Rainfall(in.)	24 hr. Snowmelt Four Trees (in.)	Predicted Snowmelt (in.)
3/07/1989	0.4	0.96	1.00
3/08/1989	1.12	0.36	1.05
3/09/1989	2.76	0.84	1.20
3/10/1989	4.84	1.20	1.45
3/11/1989	3.28	1.32	1.30

For Gold Lake, at 6,750 feet (Figure 20), it started March 1989 with 27.96 inches of snowpack water equivalent. The snowpack water equivalent increased by 4.25 inches (to 32.28 inches) during March 1 to 3, when 6 inches of precipitation fell. Between March 3 and March 11, 13 inches of precipitation fell at Gold Lake. Temperatures were near 40 F. By March 11 the snowpack water equivalent was 31.8 inches or only 0.4 inch below its highest point of the month. Therefore the pack at these elevations contributed almost no additional runoff. Again, any additional water held in the pack due to seeding would also not have been released.

Figure 21 shows data for Grizzly Ridge for the March 1989 event. The increase in snowpack water equivalent during the first 48 hours was due to snow. This 48 hour period would have most likely been seeded. As the snowpack started out with 17 inches of water content, we would assume 10 percent of this might be from seeding or 1.7 inches. Since the next storm would have been seeded we would add an additional 0.25 inch (10 percent of the 2.5 inches which fell). In total, possibly 2 inches of water might have been contributed to the pack up to the 75 hour mark in this event. The major rain on snow event occurred from 175 hours through about 250 hours. The snowpack water equivalent started out at 19.5 inches and ended at 19 inches through this period. Thus the 3.5 inches of rain that fell may have released 0.5 inches of water from the pack over two days. This is only 2.5 percent of the water equivalent in the pack, 10 percent of this is only 0.05 inches contributed from cloud seeding.

Figure 20. Hourly precipitation and temperature data collected at Gold Lake, Cal. for the period of March 1 through 11, 1989.

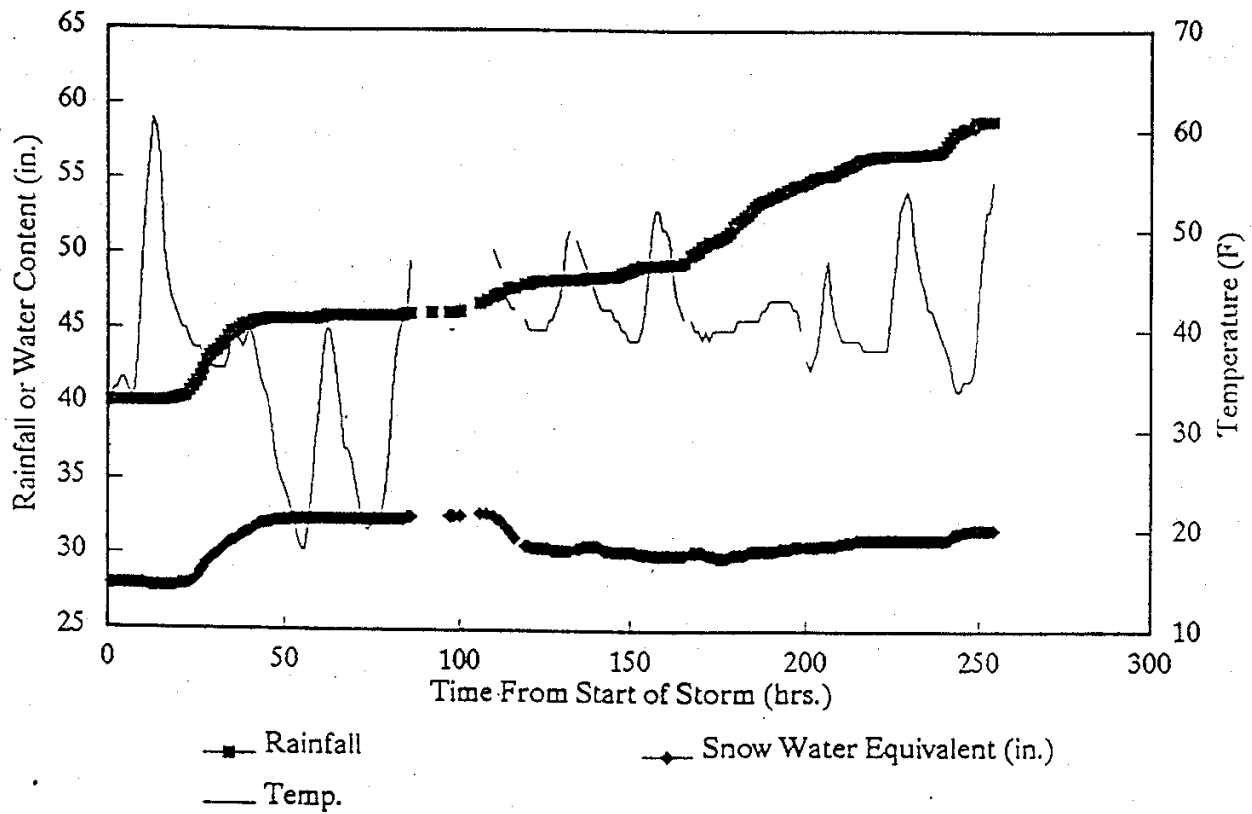
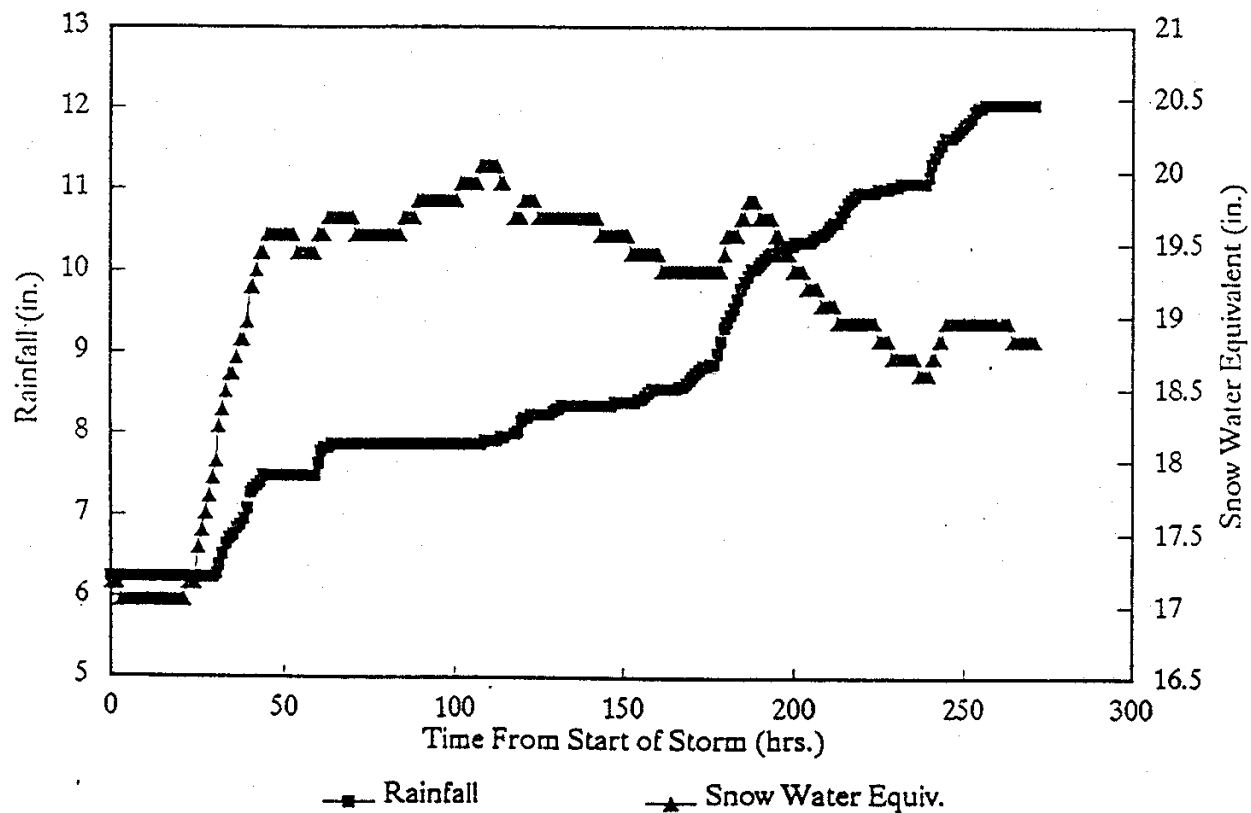


Figure 21. Hourly precipitation data collected at Grizzly Ridge, Cal. for the period March 1 through 11, 1989.



It is apparent that the primary mechanism by which additional water held in the snow from cloud seeding would contribute to runoff and subsequent erosion is if a majority of the snowpack melted. This would only be likely, given the large quantity of rain needed to melt snow, at the low elevations where a fairly shallow and transitory snowpack resides (say from 4,000 to 5,000 feet). As stated on page 48 of the Final EIR/EIS this elevation zone contributes only 15 percent of the target area watershed. In order to quantify this assumption, numerical modelling studies using the March 1989 case were conducted for a representative watershed within the target area.

Hydrologic Modelling Studies

The purpose of this study is to assess the impact of snow added by cloud seeding on the peak streamflow during a rain on snow event in the Feather River basin. Upper Greenhorn Creek, a 10 square mile watershed eight miles east of Quincy, was selected as the study area by the U. S. Forest Service. Of particular interest in this study was snowmelt from the low elevation snow transition zone. The upper Greenhorn Creek watershed ranges from 3,880 to 7,840 feet in elevation, partially within the snow transition zone.

The rain on snow event during March 7 to 11, 1989 was used as the base condition. Precipitation at Quincy during this 96-hour period was 11.9 inches, approximately a 15-year event based on Department of Water Resources depth-duration-frequency data for Quincy from 1898 to 1982. As mentioned, a week before this event, a cold storm had brought heavy snow throughout the area. This period provides ideal initial snowpack conditions for this study.

Streamflow hydrographs were developed using the U. S. Corps of Engineer's rain on snow and HEC-1 computer models. The rain on snow procedure performs a water budget analysis that accounts for the water in the snowpack until it is released as runoff. As rain falls on the snow, compaction occurs until the density threshold is reached and runoff from the pack begins. Melt is computed for elevation zones within the basin, based on storm precipitation, temperature, wind and forest cover. Output from the rain on snow procedure combines storm precipitation plus snowmelt and these values are input directly into the HEC-1 model to compute storm hydrographs (Figure 22).

Results from the March 7 to 11, 1989 event indicate that the 10 percent increase in initial snowpack water content assumed for this study from seeding of winter storms has little impact on peak flow as shown by Figure 23. The small incremental increase in snow absorbs a small portion of the precipitation early in the storm and slightly reduces the peak flow by less than 1 percent. Storm hydrographs for the same storm event, but with a shallower initial snowpack were also computed. This condition also showed that a 10 percent increase in snow due to cloud seeding would produce a slight decrease in peak flow.

Figure 22. Combined rainfall and snowmelt output from the U. S. Army Corps. of Engineers rain on snow model both for observed and simulated 50 year event. This information was input to the HEC-1 model to produce hydrographs.

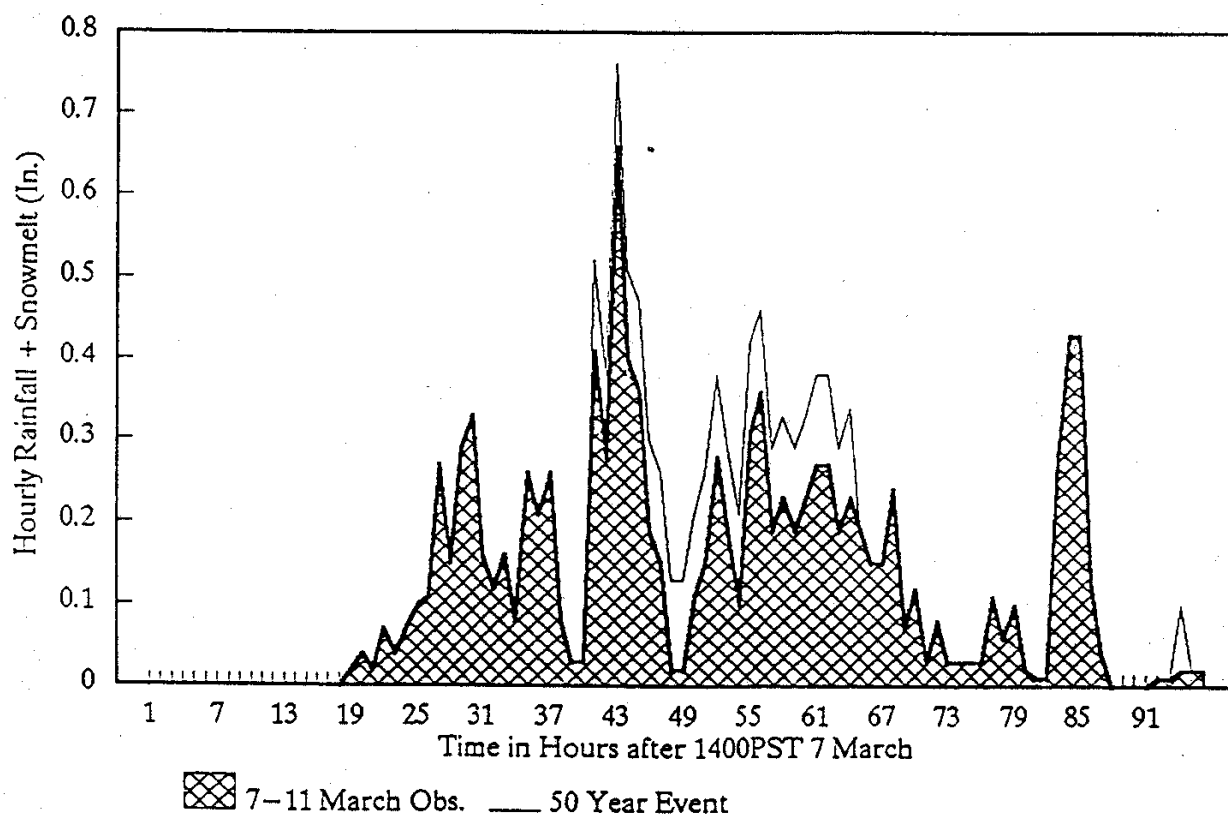
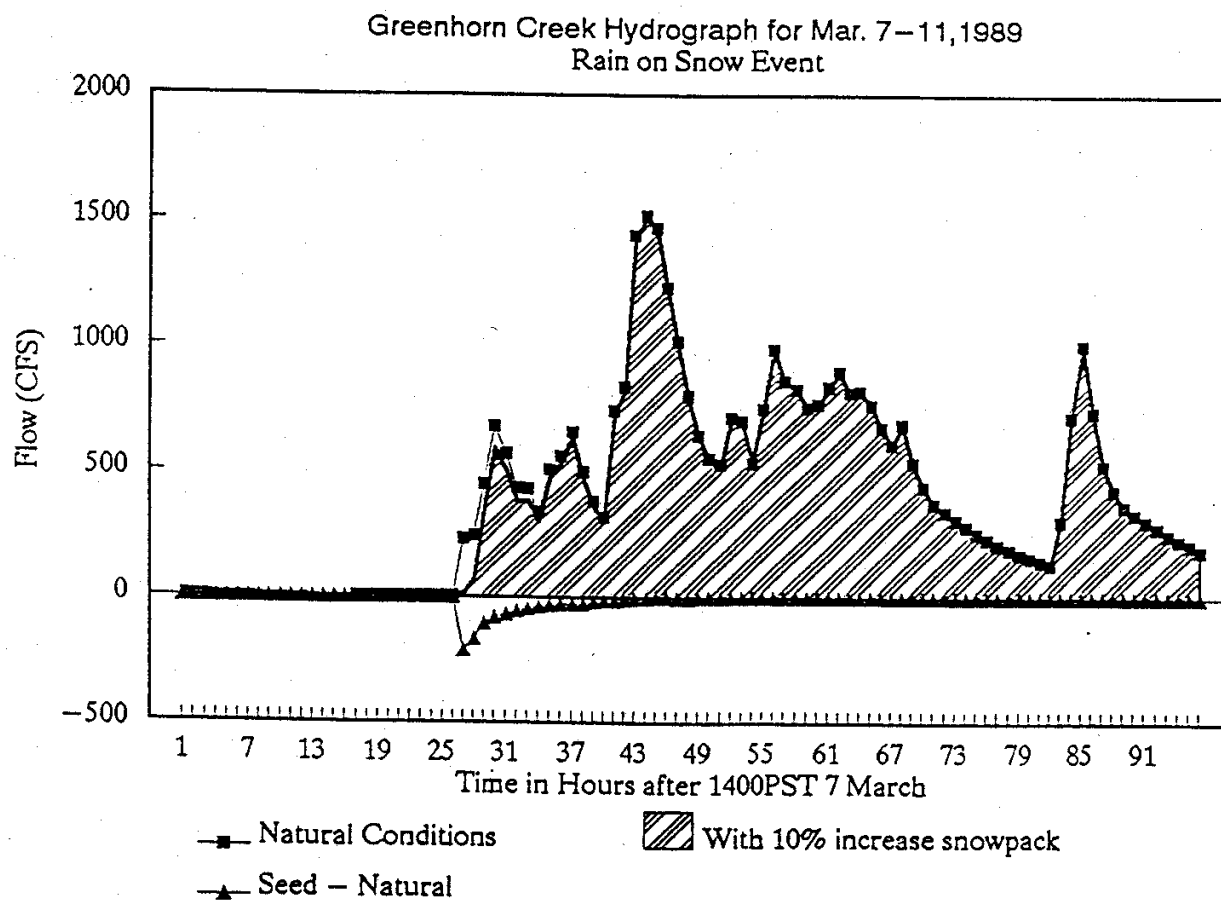


Figure 23. Hydrograph for Greenhorn Creek produced for the observed March 7-11, 1989 rain on snow event. Both the natural runoff and that predicted based on an assumed 10% increase in snowpack are shown.



A 50-year storm event (96-hour total of 14.3 inches of precipitation at Quincy) was also simulated by increasing the precipitation during the heaviest 24-hour period within the March 7 to 11 storm by 0.1 inch per hour (refer back to Figure 22).

Hydrographs comparing the effect of additional snow from cloud seeding to the base condition and for a shallow snowpack were also computed for the 50-year storm event. Results for this set of runs also indicate that the additional snow from cloud seeding produces no change in peak flow (Figures 24 and 25).

Greenhorn Creek Rain On Snow Study Model Description

The following discussion provides more detailed information of how the models were set-up.

Rain on Snow Model - The rain on snow procedure used in this study simulates the growth, compaction, and water release from the snowpack during storms that may include periods of both rain and snow. It models snow depth, density, water content and release of melt and rain in response to changing temperatures, precipitation, and wind. The watershed is separated into elevation zones with initial snow conditions specified for each zone. Temperature, wind, and precipitation vary by elevation and melt is computed for each elevation zone. The sum of the rain plus melt from each zone becomes the total rainfall excess for computing the storm hydrograph for the watershed using HEC-1.

The computer source code for this version of the model was developed by the Corps of Engineers Sacramento District. The snow compaction routine was developed by the Bureau of Reclamation. The snowmelt calculations are based on empirical equations that relate wind, temperature, and precipitation to melt. Forest cover and exposure of the watershed are accounted for in the melt equations. The Corps of Engineers uses the rain on snow model to compute probable maximum floods for spillway design and to reconstruct historical flood events. It was used to develop the hydrology for the American River Watershed Investigation draft feasibility report released in April 1991.

For the Greenhorn Creek study the distribution of the watershed area by elevation zone was specified as follows:

<u>Zone (feet)</u>	<u>Area (sq. mi.)</u>
3,888 - 4,000	0.11
4,000 - 5,000	2.26
5,000 - 6,000	2.29
6,000 - 7,000	2.55
7,000 - 7,840	<u>2.74</u>
Total	9.95

A heavy forest cover was assumed for the entire watershed.

Figure 24. Same as Figure 23 only for a simulated 50 year precipitation event.

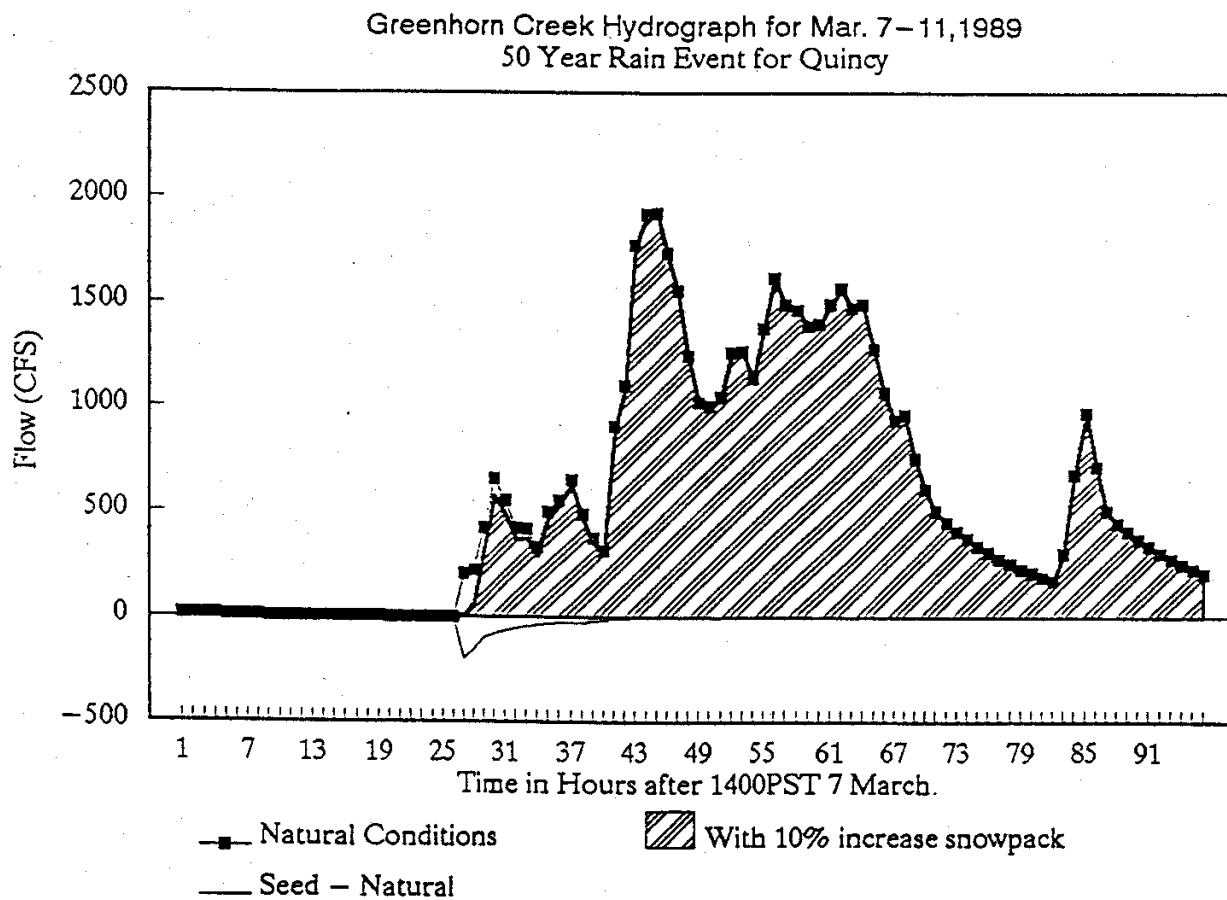
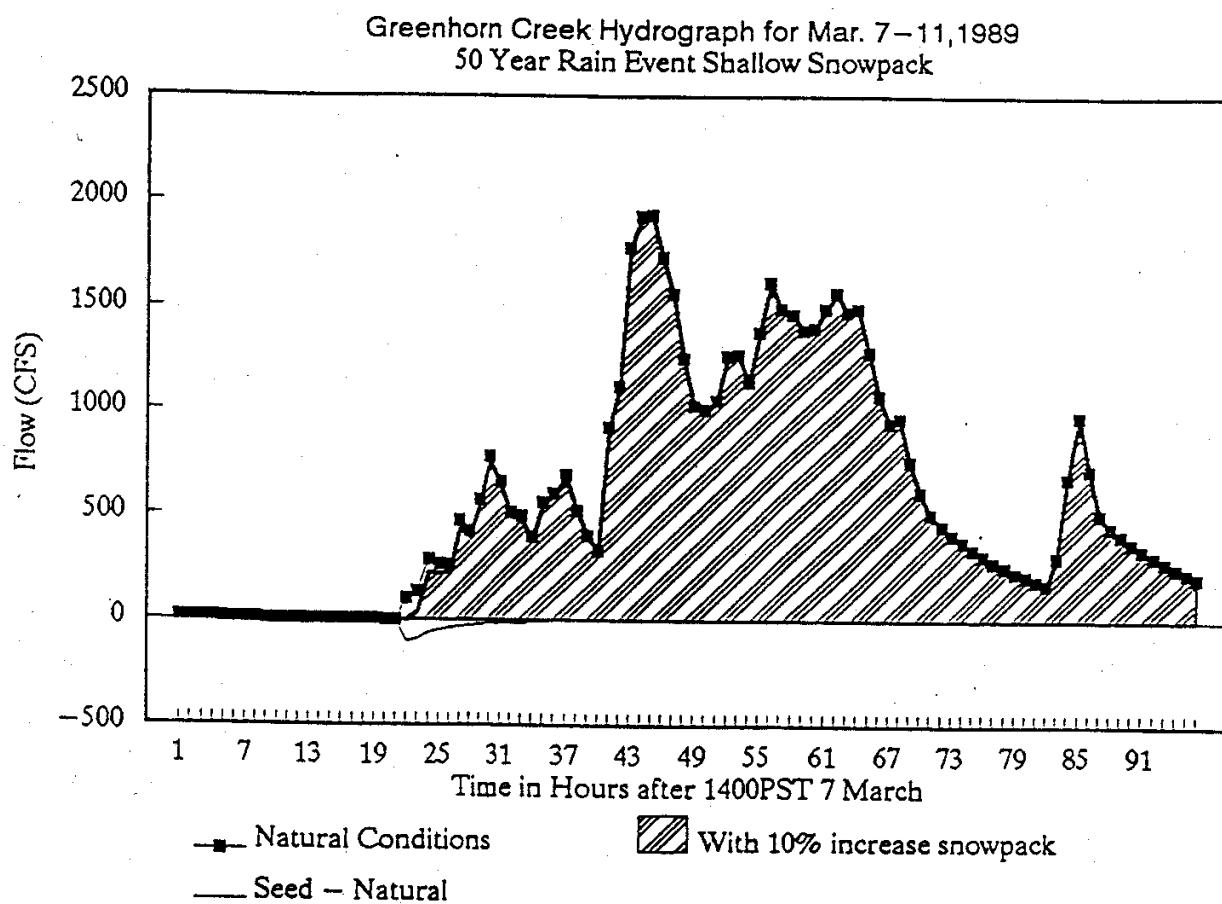


Figure 25. Same as figure 24 but having reduced the snowdepth by 10 inches in the 4,000 to 5,000 foot elevation zone.



Storm data was based on Department of Water Resources telemetered stations: hourly precipitation data at Quincy (elevation 3,400 feet) and 6-hour temperature and wind data at Mills Peak (elevation 7,400 feet). A temperature lapse rate of 1.5 degrees F per 1,000 feet from actual weather balloon profiles during the storm was applied to estimate temperatures for each zone. For this storm, wind at Mills Peak was relatively light and was not reduced at lower elevations (wind lapse rate assumed negligible). Precipitation was assumed to increase with elevation, with the highest elevation zone about 6 percent greater than the 4,000 to 5,000 foot zone.

Initial snow depth and density were estimated from Department of Water Resources snow course and snow sensor data and snowfall reports published in NOAA Climatological Data. The cold storm preceding the rain on snow event deposited substantial depths of snow at low elevations. The snow compacted during the intervening period prior to the rain on snow event. Initial snowpack densities were estimated at 30 percent for the low elevation portion of the watershed, increasing to 38 percent above 7,000 feet. The threshold density at which melt and rain is released from the snowpack was assumed to be 45 percent.

The effect of a greater initial snowpack due to cloud seeding was simulated by adding 10 percent to the initial snow depth and holding snow density constant. The rain on snow simulation showed that a small amount of precipitation early in the storm was absorbed by the incremental increase in snowpack due to cloud seeding, followed by nearly identical patterns of rain plus snowmelt during the remainder of the storm.

Rain on snow simulations were also run to test if a shallower initial snowpack would show a more pronounced effect due to cloud seeding. At the 4,000 to 5,000 foot elevation zone, the base snow condition was reduced from a depth of 22 inches (6.6 inches of water content) to a depth of 12 inches (3.6 inches of water content). Similar scaling was used for the other zones. As before, the comparison run for the cloud seeding case used 10 percent greater snow on the ground as the initial condition. Results from these runs also showed that some rain was absorbed by the incremental increase in snow due to cloud seeding during the early part of the March 7 to 11 storm.

HEC-1 Hydrographs - The computed hourly series of rain plus snowmelt from the rain on snow simulations were input to HEC-1 for with and without cloud seeding scenarios. HEC-1 is the flood hydrograph package developed by the Corps of Engineers Hydrologic Engineering Center. It is widely used to compute storm hydrographs for planning and design.

No observed flow records were available for this study because upper Greenhorn Creek is ungaged. Unit hydrograph ordinates for the watershed were computed from a procedure that uses an S-curve, basin characteristics (slope, distance to center of area, distance of longest watercourse) and a basin roughness factor to relate lag

time to basin runoff. An S-curve for the North Fork Feather River was obtained from the Corps of Engineers for this study. The time to peak runoff is slightly less than 1 hour for this watershed, so a computation interval of 1 hour was used in developing storm hydrographs. An initial basin loss value of 0.5 inches (precipitation required before runoff begins) followed by a constant loss rate of 0.1 inch per hour was used for all runs.

The following table shows a slight decrease in peak flow due to cloud seeding with actual snow conditions estimated as of March 7 and no difference in peak flow for a shallow snowpack:

<u>Base Condition</u>	<u>Peak Flow (cfs)</u>
Actual March 7 snow (est.)	1518
Actual March 7 snow + 10% from seeding	1512
Shallow snow	1519
Shallow snow + 10% from seeding	1519

50-year Storm Simulation - The rain on snow and HEC-1 models were also run for a 50-year storm event based on the March 7 to 11 precipitation pattern, but with 2.4 inches of additional precipitation added to the most intense 24-hour period of the storm. The additional precipitation was distributed during this 24-hour period by adding 0.1 inch per hour to the original series. The same initial snowpack conditions were used as described above.

Results for the 50-year storm simulations showed no difference in peak flow due to cloud seeding:

<u>Base Condition</u>	<u>50-year Storm Peak Flow (cfs)</u>
Actual Mar 7 snow (est.)	1929
Actual Mar 7 snow + 10% from seeding	1929
Shallow snow	1929
Shallow snow + 10% from seeding	1929

APPENDIX D - PROTOTYPE CLOUD SEEDING MONITORING PROGRAM

The Department of Water Resources and U. S. Forest Service completed a "Joint Environmental Impact Statement-Environmental Impact Report on the Prototype Project to Augment Snowpack by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties." No adverse effects to the environment were identified nor anticipated from the cloud seeding project. However, concerns for potential water quality degradation, downstream flooding, increased erosion, increased turbidity, and adverse effects to fish, other aquatic life, and sensitive plants from the project have been expressed by area residents. The Department will conduct monitoring in the project area to determine any significant effects from the project on water quality including turbidity, erosion, aquatic life, and sensitive plants.

Monitoring will be conducted during the five-year duration of the prototype cloud seeding project, and following the project for a period of three to five years to provide baseline data for comparison. Consultation with the U. S. Forest Service will be implemented to determine the continuance of the cloud seeding program or other appropriate actions should monitoring detect adverse effects. Methods for data collection will follow standard procedures of the Department of Water Resources, U. S. Forest Service, or widely accepted reference.

Water Quality

Water quality data in the project area is limited. The Middle Fork Feather River is known to suffer degraded water quality due to upstream agricultural activities, but little information is available on the extent of degradation or for tributary streams. Additional data needs to be collected to evaluate water quality conditions in the project area.

Water quality monitoring sites will be established in the project area to assess any effects from the project. The Middle Fork Feather River will be monitored at an upstream and a downstream site in the project area. Monitoring sites will also be established in major tributaries, including Jamison Creek, Nelson Creek, Willow Creek, and Long Valley Creek. Representative stations on these streams will allow monitoring of any water quality effects in the entire upstream drainages. As stated in the U. S. Forest Service Nelson Creek Water Quality Monitoring Plan, water quality monitoring will provide a sensitive tool for assessing impacts of land management practices. Monitoring during the cloud seeding project will provide data on effects from all activities in the watersheds. Post-project monitoring will provide data on effects from activities in the watersheds excluding any produced from cloud seeding. Comparison of project and post-project data will allow determination of any additional effects due to cloud seeding. Exact sampling locations will be determined in consultation with the U. S. Forest Service and field visits.

Monitoring will be conducted approximately monthly beginning during January 1991. Periods of high and low flows will receive emphasis in the monitoring program. High flows selected for monitoring will include the first storm runoff of the season plus at least two additional high runoff events. Any extraordinary events will also be monitored. The period of snowmelt runoff will be included in the monitoring. Parameters to be monitored include suspended sediment, dissolved oxygen, temperature, pH, electrical conductivity, turbidity, alkalinity, organic nitrogen, nitrate nitrogen, and total phosphorus.

Erosion

Numerous sources of erosion exist in the project area, including roads, logged areas, areas damaged by fires, steep unstable slopes, and natural non-point sources. The project is not expected to produce a measurable increase in erosion from these areas. The rate of snowpack melt affects erosion. Snowpack augmentation increases the duration of snowmelt, rather than the rate. Natural annual variation in runoff would also mask any effects which may be attributable to the project.

Little information is available on erosion production from potential sources in the project area. The Department will monitor typical potential erosion sources to determine sediment production.

Monitoring sites will be selected near precipitation gauges so that the relationship between erosion and precipitation may be determined. Since slope aspect may effect precipitation, sites near two precipitation gauges on south facing slopes and two gauges on north facing slopes will be monitored to provide data on erosion production. Areas near the gauges will be field visited to select specific monitoring sites. Sites selected for erosion production monitoring will include roads (cut banks and fill slopes), mountain slopes (burned areas, logged areas, and undisturbed substrate), and stream channels (substrate samples). Sediment production or changes in surface profile will be used to measure erosion from roads and mountain slopes. Substrate samples for particle size distribution will be collected during the summer from stream channels.

Fish and Other Aquatic Life

Streamflows in the project area are subject to large natural fluctuations that affect aquatic life. The project is expected to sustain runoff for a slightly longer period, which may benefit aquatic life, while not contributing significantly to damaging high flows. Effects to aquatic life from the project may not be measurable due to natural population variations. Fish populations, especially, undergo large annual population fluctuations that are often difficult to relate to physical phenomena. Analysis of aquatic habitat provides additional useful data for determining project effects.

Stream cross sections will be established near the water quality monitoring sites for

delineation of riffle habitat during the summer. Width and length of pools and riffles, cross-sectional area, water depth and velocity, and surface substrate composition will be documented at each site. A crest-stage gage will be installed to determine stage during sampling.

Benthic macroinvertebrates, as biological indicators of stream conditions, will be monitored during the spring, summer, and fall at each site. Organisms will be identified to genera, where practical, and populations estimated.

Fish will be collected from stream sections near each monitoring site. Fish will be identified to species and estimates made for population sizes. Measurements of length and weight will be obtained for determination of condition factors. The relative abundance of age classes will be determined.

Sensitive Plants

Plant species with extremely limited habitats, including narrow tolerance to soil moisture regimes, may be affected by precipitation augmentation programs that increase soil moisture levels or snowpack duration. The project will augment precipitation during below normal years, while maintaining precipitation within the normal range of variation. Soil moisture levels and snowpack duration are not expected to be altered beyond normal levels by the project.

Effects on sensitive plant populations are not expected. U. S. Forest Service botanists have concluded that it will be difficult, if not impossible, to determine whether cloud seeding affects sensitive plants. The Department, after consultation with botanists with the U. S. Forest Service, developed an extensive plan to monitor Silene invisa. This species is associated with edges of meadows and has specific moisture requirements. Monitoring this species will serve as an indicator of effects from the cloud seeding project. Annual surveys will be conducted to document effects to this indicator species. These studies will be used to determine whether effects to other rare plant populations may occur.

Coordinated Resource Management Program

Data collection activities will assess water quality, biology, and erosion potential in the project area. While providing important background data, these activities do not improve habitat conditions in the watershed. Coordinated Resource Management Programs (CRM) provide coordination of efforts of a variety of governmental agencies and concerned individuals in habitat improvement projects. The Department of Water Resources has been involved in CRM programs in the Feather River drainage, providing assistance to the Red Clover Creek CRM Demonstration Project and contributing to the solution of local problems. The Department of Water Resources will become a participant to the Jamison Creek CRM, which is currently in the formative stage. As other CRM projects become developed in the Feather River drainage, the Department will participate. Through participation in CRM projects, water quality, biological, and erosional problems can

be identified and resolved.

APPENDIX E - SUPPLEMENTAL INFORMATION FOR THE EIS

Some of the information provided in the Final Joint EIR/EIS is no longer current. The following discussion updates the information provided in the EIR/EIS.

Retirements and personnel transfers require updating of the information provided on the title sheet (page i) of the Final Joint EIR/EIS. Mary Coulombe is no longer with the Plumas National Forest. John Palmer is the current acting Forest Supervisor. Larry Mullnix has retired from the Department of Water Resources and has been replaced by John Silveira as Deputy Director. Richard Lallatin has also retired from the Department and has been replaced as project manager by Jerry Boles at the same address.

The Opportunities section (page 7, number 1) has been expanded to reflect the requirements of the current monitoring program and should read: Collect water quality, sediment, aquatic invertebrate, fish population and erosion data within the project area. The collection of additional streamflow information was not a component of the monitoring plan and should be dropped from item number 3.

At the time the Final EIR/EIS was prepared, the Department had not identified a storage area for the off-season storage of the propane tanks. The tanks will be stored on the Soper-Wheeler property within T22N, R12E, Section 7. Installation and removal of the tanks will be staged out of this site rather than the Johnsville ski area parking lot. An amended flight path is displayed in Figure 26, which was Figure 4 in the Final EIR/EIS. The Soper-Wheeler property is east of Johnsville and the helicopter flight path will be over the remote largely uninhabited area to the east of Johnsville and then south to the dispenser sites. Overflight of residences will be avoided.

Eight, not nine, precipitation gauging stations will be installed. Their locations are shown in Figure 27, which was Figure 7 in the Final EIR/EIS. Legal descriptions of these updated locations are as follows:

<u>Station</u>	<u>Location</u>	<u>Remarks</u>
1	T22N-R11E-Sec 24 SE 1/4 - NW 1/4	Located on Plumas-Eureka State Park property adjacent to existing non-automatic recording gauge. Approximate elevation - 5,200 ft.
2	T22N-R13E-Sec 33 NW 1/4 - NE 1/4	Located on land owned by USFS. The archaeological and plant survey indicated no adverse impact or disturbance by installation of gauge.
3	T23N-R12E-Sec 33 NW 1/4 - NW 1/4	Located on USFS land, accessible using USFS Road 23N06. Archaeol-

		ological and plant surveys indicate no adverse impact or disturbance by installation of gauge.
4	T23N-R12E-Sec 26 NW 1/4 - SE 1/4	This gauge has been installed on private property. The archaeological and plant survey reported no impact or disturbance by installation of gauge.
5	T23N-R12E-Sec 36 SW 1/4 - NE 1/4	Located on USFS land, accessible using USFS Road 22N04. Archaeological and plant surveys indicate no adverse impact or disturbance by installation of gauge.
6	T23N-R12E-Sec 16 NE 1/4 - SE 1/4	This gauge will be installed on private property. Archaeological and plant survey reported there was no impact or disturbance by installation of gauge.
7	T23N-R13E-Sec 17 NE 1/4 - SE 1/4	Located on USFS land, accessible by using USFS Road 24N07. Archaeological and plant surveys indicate no adverse impact or disturbance by installation of gauge.
8	T21N-R12E-Sec 2 SE 1/4 - NW 1/4	Located on USFS land, accessible by using USFS Road 22N98. Archaeological and plant surveys indicate no adverse impact or disturbance by installation of gauge.

In the discussion of wildlife species occurrence in the project area on page 35 of the Final EIR/EIS, beaver should be deleted as a "game" species.

The Erosion subsection on page 51, although technically correct, could be rewritten to provide more site specific information. The first paragraph could read: U.S. Forest Service soils data indicate that soil having high to very high erosion hazard potential occur in nearly every watershed within the project area. The area occupied by soils of high to very high erosion potential in each watersheds range from 0 to nearly 63 percent. Landslides, the major geomorphic stability problem in the project area have been identified in nearly all the watersheds in the project area. The second paragraph would be unchanged.

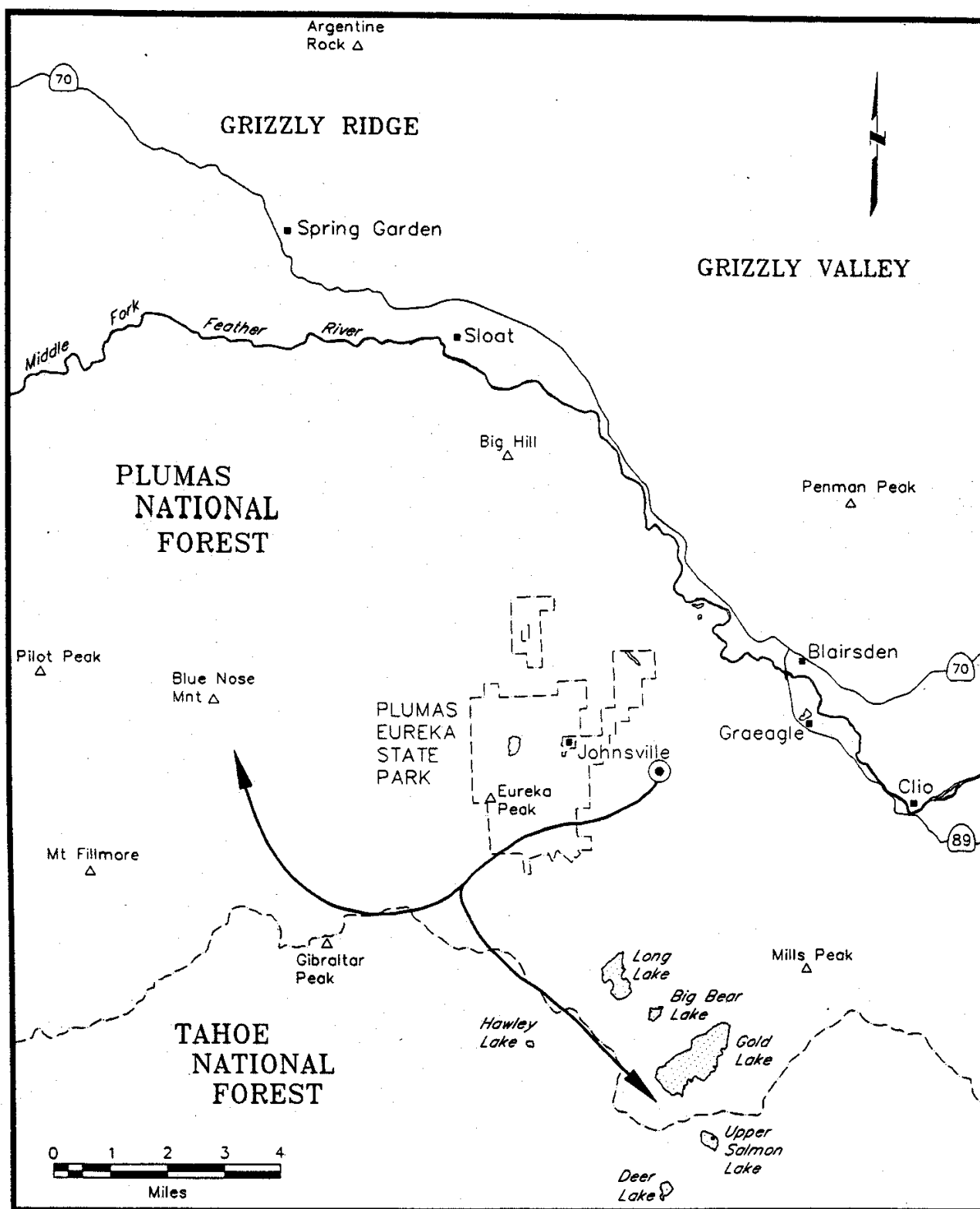


Figure 26. Flight path for Moving Propape Tanks From Staging Area to Dispenser Sites

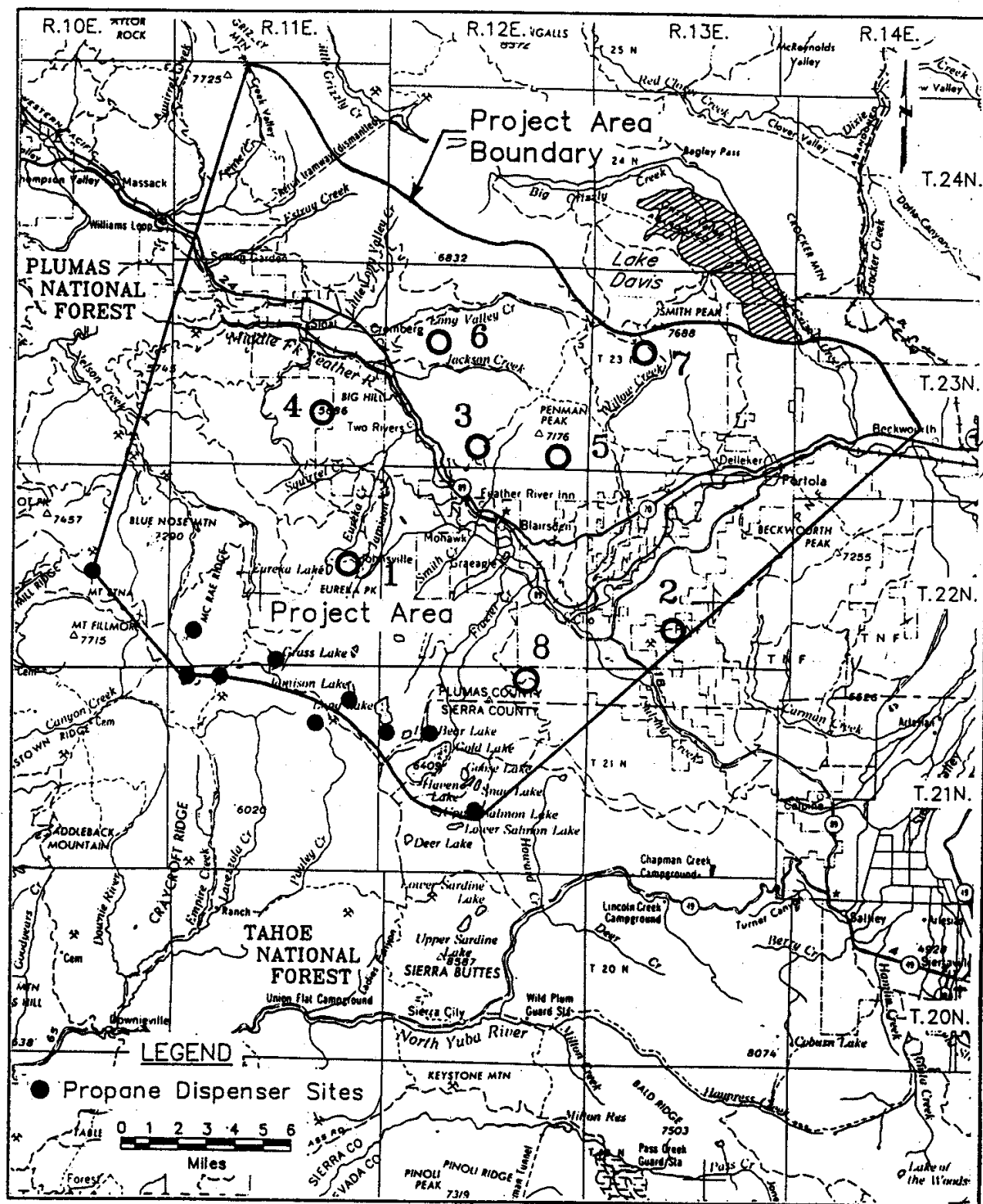


Figure 27. Approximate Precipitation Gauge Locations.

In the Endangered and Threatened Animals section (page 59), the following corrections should be added to Table 1:

U.S. = U.S. Fish and Wildlife Service

F.S. = Forest Service

State = California Department of Fish and Game

<u>Species</u>	<u>Listing</u>	<u>Status</u>
Bald Eagle	U.S.-Endangered, State-Endangered	
Golden Eagle	F.S.-Sensitive, State-Special concern, U.S.-Protected	
Prairie Falcon	State-Special concern	
Northern Goshawk	F.S.-Sensitive, State-Special concern	
Spotted Owl	F.S.-Sensitive, State-Special concern U.S. Candidate	
Short -Eared Owl	State-Special concern	
Willow Flycatcher	F.S.-Sensitive, State-Special concern	
Sierra Nevada Red Fox	U.S.-Candidate, State-Threatened F.S.-Sensitive	
Wolverine	U.S.-Candidate, State-Threatened	
Pine Marten	F.S.-Sensitive	

**APPENDIX F. CALIFORNIA SPORTFISHING PROTECTION ALLIANCE
EXHIBITS A, B, AND C**

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE

EXHIBIT "A"

TO

**DRAFT SUPPLEMENT TO THE ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROTOTYPE PROJECT TO AUGMENT SNOW PACK
BY CLOUD SEEDING USING GROUND BASED DISPENSERS
IN PLUMAS AND SIERRA COUNTIES**

OCTOBER 1, 1991



California Sportfishing Protection Alliance

Mr. R.D. Lallatin, Project Manager
Department of Water Resources
P.O. Box 607
Red Bluff, CA 96080

June 12, 1990

Re: Draft Environment Impact Statement (EIS) - Environment Impact Report (EIR) for the Proposed Prototype Weather Modification Project for the State Water Project to Augment Snow Pack in the Nelson Creek Watershed and in the Middle Fork Feather River Basin by Cloud Seeding Using Ground Based Dispensers in Plumas and Sierra Counties, California; Comments to Draft EIS-EIR by the California Sportfishing Protection Alliance (CSPA).

Dear Mr. Lallatin:

The Department of Water Resources (DWR) is proposing to conduct a five (5) year operational test program by augmenting the snow pack in an area of the Wild and Scenic Middle Fork Feather River Basin by cloud seeding winter storms using ground-based dispensers located on mountain tops in the vicinity of the Lakes Basin Area on the Plumas National Forest. Nelson Creek, a state designated wild trout stream, is also included in the project area. The additional snow pack will produce a net 21,000 acre-feet [30,000 acre-feet gross] of water for use at the Oroville Facility of the State Water Project [Oroville Reservoir] for contractors using State Water Project water. The proposed DWR project facilities will be located on both Plumas National Forest [public lands] and private lands.

The draft EIS/EIR claims the environmental document is in compliance with the National Environment Policy Act (NEPA), the California Environmental Quality Act (CEQA), Federal Regulations (CFR), Forest Service 1950 Manual, and the Plumas National Forest Land and Resources Management Plan (PNF Forest Plan).

Comments By the CSPA and Friends of Plumas Wilderness

We have reviewed the draft EIS/EIR for the proposed project. The following are the comments of the CSPA and Friends of Plumas Wilderness regarding the contents of the draft EIS/EIR:

The draft EIS/EIR for the proposed project is grossly deficient as written, is in violation of the mandatory NEPA requirements [Section 1500.2 et seq CFR 40], is in violation of the mandatory CEQA requirements [CEQA Guidelines], is not in compliance with the standards and guidelines in the PNF Forest Plan, and conflicts with State Policy regarding the Nelson Creek watershed and the Wild and Scenic Middle Fork Feather River Basin.

Water Quality Problems Directly Related to this Project

Additional snowfall and rainfall created by this project in the "project area" and in the "extended project area" will incrementally result in contributing to water quality problems presently existing in the forest environment of the PNF which will adversely affect water quality in those water problem areas. The following is a ranking of major water quality problems affecting existing water quality in the PNF:

Ranking of the Top Twelve (12) Non-Specific (Widespread) Water Quality Problems in the Plumas National Forest. [Watershed Improvement Program for the Plumas National Forest - 1989]

1. Failure to close and revegetate old roads causing erosion and sedimentation.
2. Road construction and maintenance features and techniques causing inadequate drainage and concentration of water onto sensitive soils, thus leading to erosion and sedimentation.
3. Indiscriminate use of unstabilized road surfaces in wet weather causing erosion and sedimentation.
4. Erosion from fill slopes (especially from granitic soils) is a chronic Forest-wide problem.
5. Salvage logging activities often have a disproportionately large, widespread impact on the Forest road system's drainage works.
- 6a. Undesigned berms keep water on road surface, resulting in erosion and sedimentation.
- 6b. Water bar deficiencies contribute to erosion and sedimentation.
7. Roads designed or constructed beyond the minimum needed to accomodate the use exposes additional area to erosion and sedimentation.
8. Construction of emergency fire access roads, trails and firelines in sensitive areas (along streamcourses and wet areas) causes erosion and sedimentation.
- 9a. Pulling culverts or logs from temporary roads often causes more sedimentation than the long term results of leaving them in place.
- 9b. Roads designed or reconstructed near a stream or in a flood plain without sufficient protective features are a direct source of excessive sedimentation.

10. Dry blading usually creates a fresh sediment source.

11. Sidecasting of material during road maintenance commonly results in stream and riparian damage.

12a. Surface disturbance and the exposure of mineral soil by yarding and harvesting operations is a long term source of erosion and sediment.

12b. The lack of emphasis and attention to culvert and catch basin cleaning causes excessive sedimentation.

The draft EIS-EIR failed to evaluate the above mentioned existing water quality problems in the "project area" and "extended project area" of the PNF, and the resulting direct, indirect and cumulative incremental environmental effects from this project to PNF lands. The draft EIS-EIR also failed to evaluate the effects to water quality on private lands in the "project area" and "extended project area" and the resulting direct, indirect and cumulative incremental environmental effects from this project. Both NEPA and CEQA require that the draft EIS-EIR be site specific and evaluate the potential direct, indirect and cumulative effects to the environment to be affected by the project.

As stated by the U.S. Forest Service on May 1, 1990 in their Responsive Statement to the PNF Land and Resource Management Plan Appeal and Statement of Reasons by Appellants [Friends of Plumas Wilderness, California Sportfishing Protection Alliance, Natural Resources Defense Council, Sierra Club, The Wilderness Society, Friends of the River and California Trout]:

"Maintain or improve water quality to protect beneficial uses and meet or exceed State objectives." [Page 24]

"Inventory existing water use affecting the Forest and regulate or recommend regulations of future uses to assure an adequate supply for PNF and instream needs." [Page 24]

"Reduce sediment yields from watersheds in deteriorating condition and those tributary to eroding channels or hazardous floodplain prone areas." [Page 24]

"Ensure public safety and property protection from the hazards of flooding by minimizing occupancy and modification of flood plains." [Page 24]

"Avoid water quality degradation by using Best Management Practices during land management activities, and reduce sedimentation and channel erosion by rehabilitating deteriorating watersheds." [Page 25]

"For individual projects that are initiated to implement the Plan [PNF Forest Plan], a site specific environmental analysis will be conducted. The appropriate BMPs necessary to protect or improve water quality and the methods and techniques for implementing the BMPs are identified during project-specific analysis. The methods and techniques are tailored to fit the specific physical-biological environment as well as the proposed project activities (Plan Appendix Q, p. Q-1 to Q-2, and Chapter 10 of FSH 2509.22, and to meet NEPA requirements." [Page 25] (Our Emphasis)

"The environmental analysis displayed in the EIS [Forest Plan] is a cumulative effects analysis, even though it is not specifically called that in the document. This was a broad programmatic analysis which is appropriate for decisions to be made in the adoption of a plan for the management of the PNF." [Page 28]

"Site specific decisions are not made in the Plan. This is discussed in response to Contention (a) of Sub-Issue #3A. Cumulative effects of projects are considered during the project level environmental analysis." [Page 29] (Our Emphasis)

"Based on the responses to Contentions (a) through (e) no purpose would be served in withdrawing the EIS [Plan] to perform cumulative watershed effects analysis. That level of analysis will be done for individual projects." [Page 29] (Our Emphasis)

CONCLUSION:

AS CLEARLY STATED BY THE U.S. FOREST SERVICE ON MAY 1, 1990, SITE SPECIFIC AND CUMULATIVE ENVIRONMENTAL EFFECTS WILL BE CONSIDERED DURING THE PROJECT LEVEL ENVIRONMENTAL ANALYSIS FOR INDIVIDUAL PROJECTS. THE DRAFT EIS-EIR IS GROSSLY DEFICIENT FOR FAILING TO ADDRESS, EVALUATE, AND MITIGATE THE SITE SPECIFIC AND INCREMENTAL DIRECT, INDIRECT, AND CUMULATIVE EFFECTS TO WATER QUALITY IN THE PNF AREA TO BE AFFECTED BY THE PROJECT, AND ALSO THE INCREMENTAL DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO WATER QUALITY ON PRIVATE LANDS TO BE AFFECTED BY THE PROJECT.

Questions Related to the Effects from this Project to Existing Water Quality Problems in the PNF Within the "Project Area" and the Extended Project Area".

a) How many miles of existing and old roads causing erosion and sedimentation are there in the "project and extended project areas? What will be the incremental direct, indirect and cumulative effects to water quality from erosion and sedimentation caused from this project from existing and old roads [Public/Private] in the project and extended project area? Please be specific.

b) What will be the incremental increase to erosion and sedimentation on waterways on public and private lands, and the subsequent effects to water quality from existing and old roads in the project and extended project areas from this project? Please be specific.

c) What will be the direct, indirect and cumulative incremental effects from erosion to water quality in sensitive soil areas on PNF and private lands in the project and extended project areas from this project? Please be specific.

d) The PNF is presently planning to conduct forestwide salvage and fire salvage sale projects due to the effects of the drought and wildfire. What will be the incremental direct, indirect and cumulative effects from this project to PNF soil disturbance management activities caused by PNF salvage and fire salvage activities in the project and extended project areas? Please be specific and identify specific PNF salvage and fire salvage projects and waterways to be affected in each Ranger District area.

Nelson Creek Watershed and the Middle Fork Feather River

The proposed project will incrementally alter and affect water quality in the Nelson Creek watershed, and will also incrementally alter and affect water quality in the Wild and Scenic Middle Fork Feather River Basin during runoff periods. Though the project will increase the snowpack by 5% or more, the timing of runoff events could increase the runoff significantly in conjunction with land disturbance activities (past, present, and future) causing incremental adverse effects to water quality, fishery habitat and sportfishing (turbidity- suspended sediment- higher project caused flows).

Nelson Creek is a tributary to the Wild and Scenic Middle Fork Feather River. The alteration of water quality may potential have direct, indirect and cumulative effects not only to water quality, but also to fishery habitat and sportfishing in both the Nelson Creek watershed and the Wild and Scenic Middle Fork Feather River Basin (MFFR). Both Nelson Creek and the Wild and Scenic Middle Fork Feather River were designated "Wild Trout Streams" by the State of California. It is the policy of the State of California to oppose projects which will affect designated "Wild Trout Waters".

The Wild and Scenic MFFR was designated a Wild and Scenic River by Congress and is protected under the provisions of the Wild and Scenic River Act.

Nelson Creek is one of the exceptional rivers within the Plumas National Forest. It provides unique recreation opportunities to the forest users, outstanding scenery, fine fishing and sites of historic interest. Its watershed is characterized by deeply incised canyons and steep uplands, provides dispersed recreational opportunities as well as timber, water and minerals resources.

Nelson Creek lies in a densely forested north-south oriented canyon, with a well shaded streambed. Pools and cascades are frequent especially above Cold Creek where steep stream gradients become common. Geology of the Nelson Creek drainage is dominated by the Calaveras formation, basically a slaty marine sediment of the Paleozoic time. Soils in the Nelson Creek watershed are shallow and highly erosive in the steep canyon areas. (Our Emphasis)

The climate in the Nelson Creek watershed is mediterranean, characterized by moderately cold winters and mild summers. Average annual precipitation varies from 30 inches at lower elevations to 75 inches at higher elevations. Precipitation is mainly in the form of snow, with snow at the 7,000 foot level accumulating to 47 inches water content during an average year. The watershed, 27,000 acres in size, yields a yearly average of 93,000 acre-feet of water. During the summer and fall, Nelson Creek contributes one-fourth to one-third of the Wild and Scenic Middle Fork's flow at Nelson Point, helping maintain amiable [cool water] temperatures for wild trout within the Wild and Scenic MFFR. (Our Emphasis)

Vegetation in the Nelson Creek drainage is a mixture of forest and chaparral. Greenleaf manzanita dominates the chaparral community, while the forest community is dominated by Ponderosa pine, Douglas fir and white fir at lower elevations and red fir at higher elevations. In 1982 little logging activity occurred in the drainage leaving much of the watershed covered with substantial old growth timber, however the PNF is proposing to conduct major logging activities in the near future.

The specific management objectives in the "California Department of Fish and Game Management Plan for the Nelson Creek Watershed" is as follows:

(1) To maintain wild trout populations at levels necessary to provide satisfactory recreational angling opportunities for wild trout; (2) To maintain and enhance where possible the habitat required for optimum wild trout production; and (3) To preserve the natural character of the streamside environment.

The Plan also stated that the management of backcountry streams such as Nelson Creek will also emphasize maintenance of the remote secluded quality of the angling experience, which generally involves minimizing angler encounter with man-made alterations or activities. (Our Emphasis)

In 1971, that portion of Nelson Creek between the MFFR and the confluence of the East Branch with the West Branch of Nelson Creek was designated by the State of California as a "Wild Trout Stream". The goal of the "Wild Trout Program" used in managing "Wild Trout Streams" is to preserve unique stream trout fisheries which are naturally sustained by

wild strains of trout. The guidelines for this program are: (1) To maintain wild trout populations at levels necessary to provide satisfactory recreational angling opportunities for wild trout; (2) To maintain and enhance where possible the habitat required for optimum wild trout production; and (3) To preserve the natural character of the streamside environment.

Nelson Creek is considered an outstanding fishery [Wild Trout], and was nominated by the PNF in 1970 as a prime candidate for the "Wild Trout Program". In addition, Nelson Creek was identified in the "California Protected Waterway Plan" as an important waterway deserving special consideration. The California Department of Fish and Game has remarked that the water quality of Nelson Creek is exceptional providing excellent habitat for trout. The stream's cold and well-oxygenated waters play an important role in improving the water quality in the Wild and Scenic MFFR.

CONCLUSION:

(1) THE DRAFT EIS/EIR DID NOT EVALUATE THE CONFLICT BETWEEN THIS PROJECT AND STATE POLICY WHICH GOVERNS AND PROTECTS "WILD TROUT STREAMS" IN CALIFORNIA AS DESIGNATED BY THE STATE OF CALIFORNIA. THE PROPOSED PROJECT CONFLICTS WITH STATE POLICY BECAUSE OF THE POTENTIAL TO INCREMENTALLY INCREASE RUNOFF AND CAUSE ADVERSE INCREMENTAL WATER QUALITY CONDITIONS IN THE NELSON CREEK WATERSHED IN CONJUNCTION WITH SEVERAL PROPOSED PNF TIMBER SALE PROJECTS PRESENTLY BEING PLANNED BY THE PNF. WE BELIEVE THE PROPOSED PROJECT IN CONJUNCTION WITH THE PROPOSED PNF TIMBER SALE PROJECTS WILL VIOLATE THIS STATE POLICY.

(2) THE AFFECTED ENVIRONMENT PORTION OF THE DRAFT EIS/EIR IS GROSSLY DEFICIENT AND MISLEADING IN THAT IT DID NOT PROPERLY DESCRIBE THE SITE SPECIFIC ENVIRONMENT OF THE NELSON CREEK WATERSHED TO BE AFFECTED BY THE PROJECT. [AS CLEARLY STATED ABOVE, WHICH WAS DESCRIBED IN THE FOLLOWING FEDERAL AND STATE DOCUMENTS: (1) "PNF FOREST PLAN"; (2) "PNF NELSON CREEK WATER QUALITY MONITORING PLAN"; AND THE "DFG NELSON CREEK WILD TROUT MANAGEMENT PLAN"].

THE DRAFT EIS/EIR IS DEFICIENT FOR THIS REASON BECAUSE IT FAILED TO DESCRIBE THE SITE SPECIFIC AFFECTED ENVIRONMENT OF THE NELSON CREEK WATERSHED TO BE INCREMENTALLY AFFECTED BY THE PROPOSED PROJECT. BOTH CEQA AND NEPA REQUIRES DIRECT, INDIRECT, AND CUMULATIVE EFFECTS TO BE INCLUDED IN AN EIS AND EIR. THE DRAFT EIS/EIR IS GROSSLY DEFICIENT FOR THIS REASON.

(3) THE DRAFT EIS/EIR FAILED TO EVALUATE DIRECT, INDIRECT AND CUMULATIVE PROJECT EFFECTS TO RECOMMENDATIONS, MANAGEMENT OBJECTIVES AND GOALS BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG) FOR THE WILD TROUT FISHERY OF THE NELSON CREEK WATERSHED AS STATED IN THE NELSON CREEK WILD TROUT MANAGEMENT PLAN. BOTH CEQA AND NEPA REQUIRES DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO BE INCLUDED IN

AN EIS AND EIR. THE DRAFT EIS/EIR IS GROSSLY DEFICIENT FOR THIS REASON AND IS ALSO IN VIOLATION OF THE BOTH NEPA AND CEQA REQUIREMENTS.

(4) THE DRAFT EIS/EIR CLAIMS BASED ON STUDIES CONDUCTED FOR THE SKYWATER FEIS, AND ALSO AT THE SIERRA ECOLOGY PROJECT WORKSHOPS AND THE MEDICINE BOW ECOLOGY PROJECT INVESTIGATIONS, THE INCREASED SNOWFALL AND RAINFALL AMOUNT RESULTING FROM THE PROPOSED PROJECT IS OF MINOR IMPORTANCE TO THE AQUATIC ECOSYSTEM AND WILL NOT ADVERSELY IMPACT WARMWATER FISH OR TROUT.

THE TIERING OF THIS DRAFT EIS-EIR TO ANOTHER FOREIGN FEIS DOES NOT COMPLY WITH THE NEPA REQUIREMENT. THE DRAFT EIS/EIR FAILED TO EVALUATE THE POTENTIAL ADVERSE SITE SPECIFIC DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO WATER QUALITY, FISHERY HABITAT AND THE AQUATIC RESOURCES IN THE NELSON CREEK WATERSHED FROM THE PROPOSED PROJECT. BOTH CEQA AND NEPA REQUIRES SITE SPECIFIC ENVIRONMENTAL EFFECTS TO BE INCLUDED IN AN EIS AND EIR. THE DRAFT EIS/EIR IS GROSSLY DEFICIENT FOR THIS REASON, AND IS ALSO IN VIOLATION OF THE BOTH NEPA AND CEQA REQUIREMENTS.

(5) THE SOIL WRITE-UP IN THE AFFECTED ENVIRONMENT PORTION OF THE DRAFT EIS/EIR IS GROSSLY DEFICIENT AND MISLEADING IN THAT IT DID NOT PROPERLY DESCRIBE THE SITE SPECIFIC SOILS IN THE NELSON CREEK WATERSHED. AS STATED BEFOREHAND, THE SOILS IN THE NELSON CREEK WATERSHED ARE HIGHLY EROSIIVE.

AS STATED IN THE PNF FOREST PLAN FOR THE TURKEYTOWN MANAGEMENT AREA [18] [LAPORTE RANGER DISTRICT], - " SOILS HAVE MODERATE TO HIGH ERODIBILITY. RISK OF INSTABILITY IS MODERATE TO HIGH DUE TO THE PRESENCE OF UNSTABLE YOUNGER VOLCANICS OVERLYING MORE RESISTANT BEDROCK ON STEEP SLOPES. THE ENTIRE AREA [TURKEYTOWN MANAGEMENT AREA] IS WITHIN THE WATERSHED OF NELSON CREEK, A TRIBUTARY OF THE MIDDLE FORK FEATHER RIVER."

BOTH CEQA AND NEPA REQUIRES DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO THE SOIL ENVIRONMENT OF THE NELSON CREEK WATERSHED TO BE EVALUATED AND INCLUDED IN THE DRAFT EIS AND EIR. THE DRAFT EIS/EIR IS GROSSLY DEFICIENT BECAUSE IT FAILED TO PROPERLY EVALUATE THE DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO SOILS IN THE NELSON CREEK WATERSHED.

Cumulative Effects - Proposed Timber Sale Projects

Presently the PNF has proposed a significant number of timber sale projects in the LaPorte and Beckwourth Ranger Districts which will cumulatively alter and affect water quality in the Nelson Creek watershed and also in the Wild and Scenic MFFR Basin. The alteration of water quality in both the Nelson Creek Watershed and the MFFR Basin may potentially cause adverse effects to wild trout populations and habitat.

Proposed controversial PNF timber sale projects [green tree] which will directly, indirectly and cumulatively affect the Nelson Creek Watershed are as follows: (1) Buzzards Roost Timber Sale (TS), (2) Frenchman TS, (3) Garbini TS, (4) Eureka TS, (5) Fingerboard TS, (6) Golden TS, (7) Rock TS, and the (8) Blue Nose TS.

Proposed controversial PNF timber sale projects [green] which will directly, indirectly and cumulatively affect water quality in the Wild and Scenic MFFR are as follows; (1) Feather Falls TS, (2) Barkers Cabin TS, (3) Onion Valley TS, (4) Minerva TS, (5) Hartman TS, (6) Diamond Back TS, (7) Happy TS, (8) South Fork/Rock Creek TS, and (9) Cascade TS. Subsequently, 17 known green timber sale projects will alter and affect water quality in the Wild and Scenic MFFR.

The PNF is proposing the Layman Fire Salvage Sale Project. The Layman FS Project is within the project area. The Beckwourth Ranger District is also proposing a Districtwide Salvage Sale Project. The Beckwourth Ranger District is in the project area. The PNF is also proposing 30 to 35 salvage sale projects in the Milford Ranger District. The PNF is also proposing the Eagle Fire Salvage Sale. The Eagle FS Project is also in the Milford Ranger District.

Therefore, cumulatively, a host of salvage, fire salvage and green timber sale projects being proposed by the PNF are in the project area and will alter and affect water quality in the Wild and Scenic MFFR. Also, cumulatively, a host of salvage sale projects are in the extended project area. The cumulative effects from the above mentioned projects were not evaluated in the draft EIS-EIR.

This project and the proposed PNF salvage, fire salvage and green timber sale projects as described above will have potential adverse cumulative effects to water quality and fishery habitat in the Nelson Creek watershed, in the Wild and Scenic MFFR Basin, and also in many waterways within the project and extended project areas in the PNF.

CONCLUSION:

(6) THE POTENTIAL CUMULATIVE EFFECT WRITE-UP IN THE DRAFT EIS/EIR IS GROSSLY DEFICIENT AND MISLEADING IN THAT IT DOES NOT PROPERLY DESCRIBE THE POTENTIAL CUMULATIVE ADVERSE EFFECTS TO WATER QUALITY AND FISHERY HABITAT FROM THIS PROJECT AND THE PROPOSED PNF SALVAGE, FIRE SALVAGE AND GREEN TIMBER SALE PROJECTS AS SHOWN ABOVE. THE DRAFT EIS/EIR IS GROSSLY DEFICIENT FOR FAILING TO PROPERLY EVALUATE THE CUMULATIVE EFFECTS TO WATER QUALITY AND FISHERY HABITAT IN ALL WATERWAYS AFFECTED BY THIS PROJECT AND OTHER PROJECTS BEING PROPOSED BY THE PNF.

Nelson Creek Fishery and Water Quality

Some of the PNF Management Goals for the Nelson Creek watershed are as follows:

"Management Unit 1 (22% of Watershed)"

1. "To ensure that water quality will be within the standards set by the Sacramento Regional Water Quality Control Board, water quality will be monitored periodically at established locations on the Middle Fork Feather River and Nelson Creek."

CONCLUSION:

(7) THE DRAFT EIS/EIR DID NOT INCLUDE THE SITE SPECIFIC STATE WATER QUALITY STANDARDS AND OBJECTIONS FOR THE NELSON CREEK WATERSHED AND THE MIDDLE FORK FEATHER RIVER BASIN. THE DRAFT EIS-EIR ALSO DID NOT INCLUDE A SITE SPECIFIC WATER QUALITY MONITORING PLAN TO MONITOR THE INCREMENTAL EFFECTS TO WATER QUALITY FROM THIS PROJECT AND OTHER PNF MANAGEMENT ACTIVITIES [PROPOSED PNF TIMBER/SALVAGE SALE PROJECTS] IN THE NELSON CREEK WATERSHED, AND ALSO IN THE MFFR BASIN. THE DRAFT EIS/EIR IS DEFICIENT FOR THIS REASON.

(8) THE DRAFT EIS/EIR DID NOT CONTAIN SITE SPECIFIC WATER QUALITY MONITORING LOCATIONS FOR THIS PROJECT WHICH WILL ASSURE COMPLIANCE OF THE SACRAMENTO RIVER BASIN WATER QUALITY STANDARDS AND OBJECTIVES. THE DRAFT EIS/EIR IS DEFICIENT FOR THIS REASON.

"Management Unit 4 (44% of Watershed)"

1. "Maintain the existing productivity of the area. Utilize opportunities to harvest forest products without adverse effects on water quality, wildlife habitat and visual and cultural resources."

CONCLUSION:

(9) THE DRAFT EIS/EIR DID NOT COMPLY TO THIS MANAGEMENT GOAL BECAUSE THE DOCUMENT DID NOT EVALUATE THE DIRECT, INDIRECT AND CUMULATIVE EFFECTS ON WATER QUALITY AND FISHERY HABITAT IN THE NELSON CREEK WATERSHED, AND ALSO IN THE MFFR BASIN. THE DRAFT EIS/EIR IS DEFICIENT FOR THIS REASON.

"Management Unit 5 (18% of Watershed)"

1. " Provide maximum quantity and quality of forest products on a sustained yield basis while still providing protection to water quality, soil productivity, wildlife habitat and cultural resources."

CONCLUSION:

(10) THE DRAFT EIS/EIR DID NOT COMPLY TO THIS MANAGEMENT GOAL BECAUSE THE DOCUMENT DID NOT EVALUATE THE INCREMENTAL DIRECT, INDIRECT AND CUMULATIVE EFFECTS FROM THIS PROJECT [PROPOSED TIMBER/SALVAGE SALE PROJECTS] TO WATER QUANTITIES AND QUALITY, SOIL PRODUCTIVITY AND FISHERY HABITAT IN THE NELSON CREEK WATERSHED AND IN THE MIDDLE FORK FEATHER RIVER BASIN. THE DRAFT EIS/EIR IS DEFICIENT FOR THIS REASON.

According to the PNF Nelson Creek Water Quality Monitoring Plan, "intermittent sampling of the quality of Nelson Creek indicates that Nelson Creek is characterized by water of high quality. Dissolved solids and suspended sediment are low; water temperatures cool; and dissolved oxygen, well saturated. The high quality waters of Nelson Creek not only provide an ideal habitat for trout within Nelson Creek but also improves the trout habitat within the Wild and Scenic Middle Fork Feather River."

CONCLUSION:

(11) THE INCREMENTAL INCREASE TO SNOWFALL AND RAINFALL IN THE NELSON CREEK WATERSHED DUE TO THE RESULT OF THIS PROJECT DURING RUNOFF PERIODS MAY POTENTIALLY DEGRADE WATER QUALITY IN BOTH IN THE NELSON CREEK WATERSHED AND THE MFFR BASIN. AS STATED BEFOREHAND, THE DRAFT EIS-EIR DID NOT PROVIDE FOR A MONITORING PLAN TO MONITOR THE DIRECT, INDIRECT AND CUMULATIVE EFFECTS FROM THIS PROJECT AND OTHER PNF MANAGEMENT ACTIVITIES TO WATER QUALITY AND FISHERY HABITAT IN BOTH THE NELSON CREEK WATERSHED AND THE MFFR BASIN.

THE FINAL EIS-EIR SHOULD PROVIDE FOR A MONITORING PLAN WHICH IS CONSISTENT WITH THE PNF "NELSON CREEK WATER QUALITY MONITORING PLAN". THE RESPONSIBILITY OF FUNDING THIS MONITORING PLAN SHOULD BE PAID BY THE WATER CONTRACTORS ACTING THROUGH THE DWR.

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Suspended Sediment - Suspended sediment concentrations can be critical to fish mortality and reproduction and can be significantly altered by land management activities. For trout, long chronic exposures to suspended sediment should not exceed 100 mg/l. This level produces some lethal pathology in rainbow trout."

CONCLUSION:

(12) THE DRAFT EIS-EIR DID NOT EVALUATE THE DIRECT, INDIRECT, AND CUMULATIVE INCREMENTAL EFFECTS FROM SUSPENDED SEDIMENT CAUSED BY THIS PROJECT AND OTHER PAST, PRESENT, AND FUTURE PNF MANAGEMENT ACTIVITIES IN THE NELSON CREEK WATERSHED.

WILL THE PROJECT AND OTHER PAST, PRESENT AND FUTURE PNF MANAGEMENT ACTIVITIES CAUSE SUSPENDED SEDIMENT TO CUMULATIVELY EXCEED 100 MG/L IN THE NELSON CREEK WATERSHED?

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Turbidity - Turbidity is a measure of light penetration through water. Waters high in turbidity contain suspended particles, generally silts, clay, and organic materials which absorb light, reducing the amount of light penetration. Since turbidity is an indicator of silt and clay concentration, high turbidity can influence fish mortality, growth and reproduction. Also high turbidities can reduce aquatic growth which make up the base of the food chain."

CONCLUSION:

(13) THE DRAFT EIS-EIR DID NOT EVALUATE THE DIRECT, INDIRECT, AND CUMULATIVE INCREMENTAL ENVIRONMENTAL EFFECTS FROM TURBIDITY CAUSED BY THIS PROJECT AND OTHER PAST, PRESENT, AND FUTURE PNF MANAGEMENT ACTIVITIES IN THE NELSON CREEK WATERSHED.

WILL THE PROJECT AND OTHER PAST, PRESENT, AND FUTURE PNF MANAGEMENT ACTIVITIES INCREMENTALLY AFFECT TURBIDITY TO CUMULATIVELY CAUSE FISH MORTALITY AND AFFECT FISH GROWTH AND REPRODUCTION IN THE NELSON CREEK WATERSHED? IN THE MFFR BASIN?

WILL THE PROJECT INCREMENTALLY AND CUMULATIVELY CAUSE TURBIDITY TO CUMULATIVELY AFFECT AQUATIC GROWTH IN THE NELSON CREEK WATERSHED? IN THE MFFR BASIN?

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Water Temperature - Air and water temperatures will be correlated to determine if water temperature increase increases are a result of land management activities or climatic fluctuations. Rainbow trout (the predominate species in Nelson Creek) generally desire a temperature of 7-10 degrees C. for spawning during April-June period, and populations drop with temperatures over 19 degrees C. June through October is generally the most critical period and intensive sampling will take place at that time."

CONCLUSION:

(14) WILL THE PROJECT INCREMENTALLY AND CUMULATIVELY AFFECT THE TIMING OF ADEQUATE WATER TEMPERATURE AND WILD TROUT SPAWNING CONDITIONS IN THE NELSON CREEK WATERSHED? IN WHAT SPECIFIC MANNER? PLEASE BE SPECIFIC.

WILL THE PROJECT INCREMENTALLY AND CUMULATIVELY AFFECT THE TIMING OF ADEQUATE WATER TEMPERATURE AND WILD TROUT SPAWNING CONDITIONS IN THE MFFR BASIN? IN WHAT SPECIFIC MANNER? PLEASE BE SPECIFIC.

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Benthos Fauna - Benthos fauna are aquatic organisms found in the bottom substrates of bodies of water. These fauna are influenced by changes in bottom conditions (substrate), water quality, depth, temperature and velocity. Since they are not equipped to move great distances and thus remain at basically fixed locations their presence and diversity is an indicator of water quality."

"Since most have a life history of a year or more, they can indicate past and present changes in water quality. Bottom fauna production is also related to fish production and are widely used as an index of fish-carrying capacity in trout streams. Samples [Nelson Creek] will be collected with a Serber Sampler at a minimum of 4 locations as defined by Roby (1980). Samples will be sorted and keyed to at least the family level and analyzed as to biomass and diversity."

CONCLUSION:

(15) WILL THE PROJECT INCREMENTALLY AND CUMULATIVELY AFFECT BENTHOS FAUNA BY DEGRADING WATER QUALITY AND ACCELERATING RUNOFF IN THE NELSON CREEK WATERSHED? IN THE MFFR BASIN? PLEASE BE SPECIFIC.

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Nitrate - Since nitrate is a chief biostimulant in natural waters and impacted by land management practices, it is important to monitor this nutrient to ensure it is not increased above natural background levels as a result of upstream management activities."

CONCLUSION:

(16) IN THE EVENT THIS PROJECT IS APPROVED BY THE PNF, WILL THE DWR MONITOR NUTRIENT CONDITIONS IN THE NELSON CREEK WATERSHED TO ENSURE IT IS NOT INCREASED ABOVE THE BACKGROUND LEVEL AS A RESULT OF THIS PROJECT AND THE PROPOSED PNF TIMBER/SALVAGE SALE PROJECTS.

WHAT IS THE PRESENT NUTRIENT BACKGROUND LEVEL IN THE NELSON CREEK [ALL TRIBUTARIES, INCLUDING MAIN STEM]? IN THE MFFR BASIN? [ALL TRIBUTARIES, INCLUDING MAIN STEM]?

According to the PNF Nelson Creek Water Quality Monitoring Plan, "Sampling Frequency - Sampling will be conducted throughout the year with emphasis placed on low flows and peak flows when physical and chemical parameters have their greatest impact on the aquatic biota. Ideally three samples will be taken during the spring melt period and four during low flows. Continuous sampling (one per hour) will be collected during one or two major storm events each winter." - "Additional samples will be taken following unseasonable climatic events., (flood, low flow extremes), management activities located adjacent to Nelson Creek and when notified of

a problem concerning water quality. The air-water recording thermograph will operate on a 30 day clock from July 15 through August and will be changed when samples are collected. Aquatic organisms will be sampled on or around July 15, each year."

CONCLUSION:

(17) IN THE EVENT THE PNF APPROVES THIS PROJECT, WILL THE DWR CONDUCT WATER QUALITY MONITORING SURVEYS IN ACCORDANCE WITH THE SCHEDULE IDENTIFIED IN THE PNF NELSON CREEK WATER QUALITY MONITORING PLAN?

Nelson Creek - PNF Standards and Guidelines

The standards and guidelines for the Nelson Creek watershed in management areas administered by the PNF in the PNF Forest Plan requires the following:

a) For projects affecting the Nelson Creek Wild Trout Stream, coordinate with the California Department of Fish and Game. Prepare and implement a Wild Trout Habitat Management Plan, Maintain sufficient flows in Nelson Creek to meet the needs of the Wild Trout fishery.

CONCLUSION:

(18) THE PNF FOREST PLAN REQUIRED THE DWR TO COORDINATE WITH THE DEPARTMENT OF FISH AND GAME (DFG) FOR PROJECTS AFFECTING THE NELSON CREEK WATERSHED. THE PROPOSED PROJECT AND OTHER PNF PAST, PRESENT AND FUTURE TIMBER/SALVAGE SALE PROJECTS WILL ALTER AND AFFECT WATER QUALITY IN THE NELSON CREEK WATERSHED AND ALSO IN THE MFFR BASIN. THE DRAFT EIS-EIR DID NOT SHOW WHETHER THE DWR CONSULTED WITH THE DFG PRIOR TO THE DOCUMENT BEING PREPARED AND SUBMITTED FOR PUBLIC REVIEW. ALSO THE FEDERAL U.S. FISH AND WILDLIFE COORDINATION ACT REQUIRED THE DWR TO CONSULT WITH THE DFG AND THE U.S. FISH AND WILDLIFE SERVICE. THE DRAFT EIS-EIR DID NOT SHOW THE DWR CONSULTED WITH BOTH THE DFG AND THE U.S. FISH AND WILDLIFE SERVICE.

WE BELIEVE THE FAILURE OF THE DWR TO COORDINATE AND CONSULT WITH THE DFG DURING THE PLANNING STAGE FOR THIS PROJECT VIOLATED THE PNF FOREST PLAN. WE ALSO BELIEVE THE FAILURE OF THE DWR TO CONSULT WITH THE DFG AND THE U.S. FISH AND WILDLIFE SERVICE DURING THE PLANNING OF THIS PROJECT WAS A VIOLATION OF THE U.S. FISH AND WILDLIFE COORDINATION ACT.

b) Prepare and implement a water quality monitoring plan for Nelson Creek.

CONCLUSION:

(19) The PNF Forest standards and guidelines required the PNF to prepare and implement a water quality plan for Nelson Creek to protect and improve

water quality. The proposed project will incrementally alter and affect water quality both directly, indirectly and cumulatively. The draft EIS-EIR did not include a water quality monitoring plan for this project which was approved by the PNF for the Nelson Creek watershed.

WE BELIEVE BEFORE THIS PROJECT IS APPROVED BY THE PNF, THERE MUST BE A WATER QUALITY MONITORING PLAN PREPARED AND IMPLEMENTED BY THE DWR AND THE PNF FOR THE NELSON CREEK WATERSHED TO DETERMINE THE DIRECT, INDIRECT AND CUMULATIVE EFFECTS TO WATER QUALITY AND FISHERY HABITAT FROM BOTH THIS PROJECT AND OTHER PNF MANAGEMENT ACTIVITIES [PROPOSED TIMBER/SALVAGE/FIRE SALVAGE SALE PROJECTS].

c) Employ Forestwide Standards and Guidelines for water, water use and need.

CONCLUSION:

(20) THE DRAFT EIS-EIR DID NOT SPECIFICALLY ADDRESS, EVALUATE AND IMPLEMENT THE FORESTWIDE STANDARDS AND GUIDELINES FOR WATER, WATER USE AND NEED. THIS IS A GLARING DEFICIENCY.

g) Evaluate operating plans to assure minimum disturbance to fish habitat, streamside vegetation, and scenic quality of Nelson Creek.

CONCLUSION:

21) THE PROPOSED PROJECT WILL INCREMENTALLY ALTER AND AFFECT FISH AND AQUATIC POPULATIONS AND HABITAT DIRECTLY, INDIRECTLY AND CUMULATIVELY IN ASSOCIATION WITH EXISTING AND: (a) PROPOSED MINING ACTIVITIES, (b) PROPOSED PNF TIMBER/SALVAGE/FIRE SALVAGE SALE PROJECTS AND (c) OTHER PNF MANAGEMENT ACTIVITIES. THIS WAS NOT ADDRESSED AND EVALUATED IN THE DRAFT EIS-EIR.

h) Close or temporarily close all roads for resource management near Nelson Creek.

CONCLUSION

22) THERE APPEARS TO BE ROADS ALONG THE NELSON CREEK WATERSHED WHICH MAY POTENTIAL CONTRIBUTE TO EROSION AND SEDIMENTATION PROBLEMS WHICH MAY AFFECT WATER QUALITY IN THE NELSON CREEK WATERSHED AND ALSO WATER QUALITY IN THE MFFR BASIN. THE PROPOSED PROJECT MAY INCREMENTALLY CONTRIBUTE TO INCREASED EROSION AND SEDIMENTATION BY THESE SAME ROADS. THIS WAS NOT ADDRESSED OR EVALUATED IN THE DRAFT EIS-EIR. PLEASE IDENTIFY AND EVALUATE THE ROADS WHICH MAY BE CAUSING EROSION AND SEDIMENTATION PROBLEMS IN THE NELSON CREEK WATERSHED [ALL TRIBUTARIES AND THE MAIN STEM].

Middle Fork Feather River - PNF Forest Plan Standards and Guidelines

The standards and guidelines for the Wild and Scenic Middle Fork Feather River in management areas administered by the PNF in the PNF Forest Plan requires the following:

a) Manage the Wild, Scenic and Recreation Zones consistent with the Wild and Scenic Rivers Act. Employ the Rx-2 Prescription.

CONCLUSION:

(23) RX-2 PRESCRIPTION REQUIRED THE DWR AND PNF TO MINIMIZE SOIL LOSS AND IMPROVE WATER QUALITY IN THE MFFR TO CONTROL OR PREVENT EROSION THAT DAMAGES SCENIC QUALITY OR ENDANGERS WATER QUALITY AND THE FISHERY OF THE MFFR. THE PROPOSED PROJECT WILL INCREMENTALLY ALTER AND AFFECT WATER QUALITY IN THE MFFR. THE PROPOSED PROJECT WILL INCREMENTALLY AFFECT SOILS WHICH HAVE BEEN DISTURBED IN THE PROJECT AND EXTENDED PROJECT AREAS. THE PROPOSED PROJECT IN CONJUNCTION WITH OTHER PROPOSED PNF TIMBER/SALVAGE/FIRE SALVAGE SALE PROJECTS IN THE NELSON CREEK WATERSHED, AND ALSO IN THE MFFR WATERSHED, WILL CUMULATIVELY ALTER AND EFFECT WATER QUALITY AND FISHERY HABITAT IN THE MFFR, AND MAY ADVERSELY AFFECT WATER QUALITY AND FISHERY HABITAT IN THE MFFR.

THE DWR FAILED TO CONDUCT CUMULATIVE WATERSHED EFFECTS ANALYSES (CWEA) FOR THE NELSON CREEK WATERSHED AND THE MFFR WATERSHED [ALL TRIBUTARIES AND MAIN STEM]. THE PNF IS REQUIRED TO CONDUCT CWEA'S FOR ALL PROJECTS AFFECTING WATER QUALITY IN THE PNF. THE DRAFT EIS-EIR IS DEFICIENT BECAUSE THE DWR DID NOT CONDUCT CWEA'S, AND INCLUDE THE RESULTS OF THESE ANALYSES IN THE DRAFT EIS-EIR. WITHOUT THESE CWEA ANALYSES THE DRAFT EIS-EIR IS GROSSLY DEFICIENT.

THE RX-2 PRESCRIPTION REQUIRES THE PNF TO WORK CLOSELY WITH THE REGIONAL WATER QUALITY CONTROL BOARD TO DETECT AND CONTROL POLLUTANT EMISSIONS AND SPILLS. THE DRAFT EIS-EIR DID NOT HAVE A CONTINGENCY PLAN TO PREVENT ADVERSE WATER QUALITY PROBLEMS FROM THE STORING AND SPILLING OF PROPANE INTO THE STATE'S WATERS IN THE PROJECT AND EXTENDED PROJECT AREA. CONSEQUENTLY THE DRAFT EIS-EIR IS NOT IN COMPLIANCE WITH THE FORESTWIDE STANDARDS AND GUIDELINES TO PROTECT AND IMPROVE WATER QUALITY AFFECTING THE MFFR AND OTHER WATERWAYS.

THE RX-2 PRESCRIPTION REQUIRES THE PNF, IN COOPERATION WITH THE REGIONAL WATER QUALITY CONTROL BOARD, TO ESTABLISH WATER QUALITY OBJECTIVES FOR THE MFFR THAT MEET FEDERAL STANDARDS. THE DRAFT EIS-EIR IS DEFICIENT BECAUSE IT FAILED TO IDENTIFY AND COMPLY TO THOSE OBJECTIVES AND STANDARDS FOR THE MFFR.

THE RX-2 PRESCRIPTION REQUIRES THAT NON-FEDERAL USES MUST HAVE PUBLIC BENEFIT, AND THAT THE PNF SHOULD ISSUE PERMITS FOR ACTIVITIES WITH PUBLIC BENEFIT IF COMPATIBLE WITH OTHER DIRECTIONS WITHIN THE RX-2 PRESCRIPTION. THIS PROJECT IS FOR NON-FEDERAL USES. WE BELIEVE THE PROPOSED PROJECT AND OTHER PROPOSED PNF TIMBER/SALVAGE SALE PROJECTS WILL CONFLICT WITH THE RX-2 PRESCRIPTION FOR THE MFFR.

b) Maintain the character of the Middle Fork Feather River semi-primitive areas. Employ the Rx-8 Prescription.

CONCLUSION:

(24) THE RX-8 PRESCRIPTION REQUIRES THAT THE PNF CAN ONLY ALLOW FACILITIES [THIS PROJECT] ONLY AFTER AN ANALYSIS DETERMINES THAT THE ESSENTIALLY UNDISTURBED CHARACTER OF THE AREA CAN BE RETAINED. AS CLEARLY SHOWN IN THIS LETTER OF COMMENT THE DRAFT EIS-EIR IS CLEARLY DEFICIENT AND HAS NOT DETERMINE, BY ANALYSIS (S), WHETHER THE PROPOSED PROJECT WILL NOT DISTURB THE CHARACTER OF THE SEMI-PRIMITIVE AREA BECAUSE OF RELATED AND ASSOCIATED INCREMENTAL AND CUMULATIVE WATER QUALITY AND SOIL MOVEMENT PROBLEMS AS A RESULT OF THE PROJECT.

THE RX-8 ALSO REQUIRES THE PNF TO REDUCE PREVENTABLE HUMAN CAUSED WILDFIRES. THE PROPOSED PROJECT HAS THE POTENTIAL TO CAUSE A WILDFIRE WHICH MAY HAVE FAR REACHING ADVERSE EFFECTS TO GREEN TREES AND THE FOREST ENVIRONMENT. THE PNF PRESENTLY HAS ABOUT 300,000 MILLION BOARD FEET OF DEAD AND DRYING TREES WHICH ARE A FIRE HAZARD.

THEREFORE WE URGE THE PNF BEFORE APPROVING THIS PROJECT TO DEVELOP A WRITTEN AGREEMENT WITH THE DWR WHICH REQUIRES THE DWR TO REPAY THE PNF FOR ALL DAMAGES TO THE FOREST ENVIRONMENT [PUBLIC LANDS AND RESOURCES] FROM WILDFIRES CAUSED BY THEIR FACILITIES [RECOVERY PLAN, GREEN TREES (PER BOARD FOOT-MARKET VALUE), REHABILITATION OF WATERSHEDS, IMPROVEMENTS FOR TROUT, WILDLIFE AND SPOTTED OWL HABITAT, AND PAYMENT FOR ALL PNF MAN HOURS].

Lake Basin Area

The Lakes Basin Management Area extends south of the Plumas-Eureka State Park to the Yuba-Feather River drainage divide (the Forest boundary) and is bound on the east by the Gold Lake Highway. Most of this management area is in Plumas County, but 2,658 acres are in Sierra County.

The Lakes Basin Area contains numerous small snow ponds and over twenty lakes, ranging in size from three acres to the 500 acre Gold Lake. Topography varies from the steep U-shaped Florentine Canyon in the northwest to a broad, flat glacial moraine in the southeast occupied by Snag and Goose Lakes. Valleys are separated by sharp peaks and ridges of

exposed rock. Elevations range from 5,200 feet in lower Gray Eagle Creek to 7,812 feet on top of Mt. Elwell, and most of the area is above 6,000 feet. Soils in the Basin Lakes Area are thin, rocky and generally highly erodible. The area is drained by Jamison, Smith, Gray Eagle, and Frazier Creeks, tributaries to the Wild and Scenic Middle Fork Feather River. Long Lake on Gray Eagle Creek provides domestic water for the town of Graeagle.

Vegetation in the area is sub-alpine and varies considerably from thick stands of red fir to dense brushfields with scattered Jeffrey pine on areas of shallow soil. Numerous small wet meadows and scattered stands of lodgepole pine and aspen are in the wetter areas. Pockets of mountain hemlock occur on the higher ridges and peaks, and western white pine is scattered throughout the area. The area has an equal diversity of wildlife habitat and species, with deer from the Sloat herd summering in the area. Most of the lakes and streams contain trout and are heavily fished. Spotted owl territories are included.

The Lakes Basin Area was established in 1926 by the Secretary of Agriculture, requiring that the area be used for recreation purposes and that other uses not impair the recreational values.

CONCLUSION:

(26) THE PROPOSED PROJECT COULD HAVE POTENTIAL INCREMENTAL ADVERSE EFFECTS TO THE PUBLIC RECREATION VALUES AND OPPORTUNITIES IN THE LAKE BASIN AREA BY EXTENDING THE WINTER SEASON [CAMPING-COLD WEATHER], CAUSING FLOODING, AFFECTING TRANSPORTATION AND ROAD CONDITIONS IN THE AREA, AFFECTING FISHING [TURBIDITY], CAUSING WILDFIRES CAUSED BY PROJECT OPERATIONS [PUBLIC SAFETY-PROPERTY], AND AFFECTING WATER QUALITY AND FISHERY HABITAT IN STREAMS AND LAKES WITHIN THE AREA.

WE BELIEVE THE SECRETARY OF AGRICULTURE INTENDED THE LAKE BASIN AREA TO BE AN AREA SOLELY USED FOR PUBLIC RECREATION, AND NOT AN AREA TO OPERATE WEATHER MODIFICATION FACILITIES [THIS PROJECT] WHICH MAY IMPAIR THE AREA. THEREFORE WE ARE REQUESTING THE U.S. FOREST SERVICE [SOLICITOR'S OFFICE] TO OBTAIN A WRITTEN LEGAL OPINION WHICH CLEARLY STATES THAT THIS TEST PROJECT AND THE LONG TERM PROJECT [50 PROPANE FACILITIES] ARE COMPATIBLE WITH THE FULL INTENT OF THE DIRECTIVE OF THE SECRETARY OF AGRICULTURE IN 1926, AND WILL NOT IMPAIR THE RECREATIONAL VALUES OF THE AREA. PLEASE INCLUDE THE SOLICITOR'S OPINION IN THE FINAL EIS-EIR.

The standards and guidelines for the Lakes Basin Management Area are administered by the PNF in the PNF Forest Plan as following:

- a) Maintain the Lakes Basin Recreation Area by employing the Rx-5 and Rx-6 Prescriptions.

CONCLUSION:

(27) THE RX-5 PRESCRIPTION REQUIRES THE PNF TO PROTECT RECREATIONAL VALUES IN THE LAKE BASIN RECREATION AREA AND IT DOES NOT ALLOW THE HARVESTING OF TIMBER WITHIN THE LAKE BASIN AREA. CLEARLY THE RX-5 PRESCRIPTION WAS DEVELOPED BY THE PNF CONSISTENT WITH THE INTENT OF THE SECRETARY OF AGRICULTURE AS NOTED ABOVE. THEREFORE, AS STATED BEFOREHAND, A LEGAL OPINION FROM THE U.S. FOREST SERVICE SHOULD BE MADE BEFORE THIS PROJECT IS APPROVED BY THE PNF.

b) The Rx-5 Prescription requires the implementation of the Forestwide Standards and Guidelines in the PNF Forest Plan.

CONCLUSION:

(28) THE FORESTWIDE STANDARDS AND GUIDELINES REQUIRES THE PNF TO PROTECT HIGHLY SENSITIVE WATERSHEDS THRU CUMULATIVE IMPACT PLANNING. THE DWR DID NOT CONDUCT CUMULATIVE WATERSHED EFFECTS ANALYSES FOR SENSITIVE STREAMS WITHIN THE PROPOSED PROJECT AND EXTENDED PROJECT AREAS. THE DRAFT EIS-EIR IS GROSSLY DEFICIENT FOR FAILING TO COMPLY TO CUMULATIVE IMPACT PLANNING AS REQUIRED BY THE PNF FOREST PLAN.

(29) THE FORESTWIDE STANDARDS AND GUIDELINES REQUIRES THE PNF TO PRESERVE WATERSHED CONDITIONS SO THAT SOIL PRODUCTIVITY AND WATER QUALITY ARE MAINTAINED. THE FORESTWIDE STANDARDS AND GUIDELINES REQUIRES THE PNF DURING PROJECT ACTIVITIES TO MINIMIZE EXCESSIVE LOSS OF ORGANIC MATTER AND LIMIT SOIL DISTURBANCE ACCORDING TO THE EROSION HAZARD RATING (EHR). THE DWR DID NOT CONDUCT "EHR'S" FOR THE PROJECT AND EXTENDED PROJECT AREAS. THE DRAFT EIS-EIR IS NOT IN COMPLIANCE WITH THE FORESTWIDE STANDARDS AND GUIDELINES FOR FAILING TO CONDUCT EHR'S AND IS DEFICIENT FOR THIS REASON

30) THE FORESTWIDE STANDARDS AND GUIDELINES REQUIRES THE PNF TO PROTECT PUBLIC SAFETY AND FOREST RESOURCES FROM SLOPE FAILURE, AND TO AVOID OR PROVIDE SPECIAL TREATMENT OF UNSTABLE AREAS TO AVOID TRIGGERING MASS MOVEMENT. THE DRAFT EIS-EIR DID NOT PROVIDE FOR SPECIAL TREATMENT OF UNSTABLE AREAS TO AVOID TRIGGERING MASS MOVEMENT INCREMENTALLY CAUSED BY THIS PROJECT. THEREFORE THE DRAFT EIS-EIR IS NOT IN COMPLIANCE WITH THE FORESTWIDE STANDARDS AND GUIDELINES MAKING THE DRAFT EIS-EIR DEFICIENT.

(30) THE FORESTWIDE STANDARDS AND GUIDELINES REQUIRES THE PNF TO APPLY FORESTWIDE STATE OBJECTIVES TO MUNICIPAL SUPPLY WATERSHEDS AND WHEN PLANNING PROJECTS WITHIN THESE WATERSHEDS TO PERFORM HYDROLOGIC SURVEYS AND ANALYSES, AND THEREAFTER MONITOR FOR COMPLIANCE WITH BMP'S.

THE PROPOSED PROJECT, AND PAST, EXISTING AND PROPOSED PNF TIMBER/SALVAGE/FIRE SALE PROJECTS WILL CUMULATIVELY ALTER AND AFFECT WATER QUALITY IN THE MFFR BASIN CAUSING ADDITIONAL SEDIMENT TO BE CARRIED AND DEPOSITED INTO OROVILLE RESERVOIR. ALSO THE NORTH FORK FEATHER RIVER, SOUTH FORK FEATHER RIVER, WEST BRANCH OF THE FEATHER RIVER, AND MANY OTHER TRIBUTARIES CARRY AND DEPOSIT SEDIMENT INTO OROVILLE RESERVOIR.

OROVILLE RESERVOIR IS PART OF THE STATE WATER PROJECT AND PROVIDES WATER FOR SWP WATER CONTRACTORS WHO ARE FUNDING THIS PROJECT. THE DEPOSITING OF SEDIMENT INCREMENTALLY INTO OROVILLE RESERVOIR WHICH WILL BE CAUSED BY THIS PROJECT AND OTHER PNF AND PRIVATE LAND MANAGEMENT ACTIVITIES WILL ALTER AND AFFECT STORAGE CAPACITY IN OROVILLE RESERVOIR, AND WITHIN TIME, WILL BE SIGNIFICANT ENOUGH TO REDUCE STORAGE CAPACITY OF THE RESERVOIR. THIS IN TURN WILL AFFECT THE WATER USERS WHO ARE USING SWP WATER, AND WHO ARE PROPOSING THIS PROJECT.

THE DRAFT EIS-EIR DID NOT INCLUDE THE RESULTS OF HYDROLOGIC SURVEYS AND ANALYSES WHICH EVALUATES THE CUMULATIVE EFFECTS TO OROVILLE RESERVOIR FROM THE EFFECTS OF SEDIMENTATION CAUSED INCREMENTALLY BY THIS PROJECT AND OTHER PAST, PRESENT AND FUTURE PNF AND PRIVATE LAND MANAGEMENT ACTIVITIES IN ALL WATERSHEDS FLOWING INTO OROVILLE RESERVOIR. THE DRAFT EIS-EIR IS DEFICIENT FOR THIS REASON.

c) The Rx-6 Prescription requires the implementation of the Forestwide Standards and Guidelines in the PNF Forest Plan.

CONCLUSION:

(32) THE LOCATIONS OF THE PROPANE DISPENSERS FOR THIS PROJECT ARE LOCATED NEAR AND ADJACENT TO THE PACIFIC CREST TRAIL (PCT). THE DRAFT EIS-EIR STATES THAT MOST SITE LOCATIONS WILL BE LOCATED IN REMOTE AREAS AWAY FROM WINTER USE ACCESS AREAS. THE DRAFT EIS-EIR ALSO STATES THAT THE PROPANE DISPENSERS WILL BE IN PLACE DURING PERIODS OF LOW RECREATIONAL USE MINIMIZING POTENTIAL CONTACT WITH RECREATIONALISTS, AND THAT DISPENSERS WILL BE DIFFICULT TO LOCATE WITHOUT SPECIFIC DIRECTIONS. THE DRAFT EIS-EIR FURTHER STATED THAT ALL DISPENSERS WILL BE PAINTED WHITE TO BLEND IN WITH THE SNOW BACKGROUND, AND THAT BY USING AN APPROVED FOREST SERVICE FIRE PLAN AND BY TRANSPORTING THE FILLED TANKS OVER TERRAIN AWAY FROM ANY POPULATED REGIONS, PUBLIC SAFETY WILL NOT BE JEOPARDIZED. (OUR EMPHASIS)

ALL OF THE TEN POTENTIAL SITES FOR THE PROPANE DISPENSERS WILL BE LOCATED IN AREAS ALLOCATED FOR SEMIPRIMITIVE MANAGEMENT BY THE PNF. THE RX-6 PRESCRIPTION REQUIRES COMPLIANCE OF THE FORESTWIDE STANDARDS AND GUIDELINES. THE FORESTWIDE STANDARDS AND GUIDELINES UNDER VISUAL RESOURCES REQUIRES THE PNF TO MAINTAIN VISUAL QUALITY ALONG THE PCT AND TO EMPLOY A V.Q.O. OF "PARTIAL RETENTION" IN THOSE AREAS VIEWED AS

FOREGROUND FROM THE PCT, AND ALLOW A V.Q.O. OF "MODIFICATION" IN THE MIDDLE AND BACKGROUND.

DWR SHOULD PREPARED A VISUAL QUALITY PLAN WHICH USES THE VISUAL MANAGEMENT SYSTEM (VMS) TO ENSURE THAT THE PROPOSED PROPANE SITES WILL NOT EFFECT HIKERS USING THE PCT, AND ALSO AFFECT SKIERS AND SNOWMOBILES WHO USE THE RIDGETOPS FOR WINTER RECREATION. THE DRAFT EIS-EIR DID NOT HAVE A VISUAL QUALITY PLAN USING THE VMS REQUIREMENTS AND OBJECTIVES. AS STATED IN THE PNF VMS [APPENDIX K- PNF FOREST PLAN], THIS PROCESS INVOLVES INVENTORY, ANALYSIS, AND THE DETERMINATION OF VISUAL MANAGEMENT OBJECTIVES AND PROVIDES FOR THEIR INPUT INTO AN INTEGRATED RESOURCES PLANNING AND DECISION MAKING PROCESS.

THE DRAFT EIS-EIR IS DEFICIENT BECAUSE IT FAILED TO INCLUDE A VISUAL QUALITY PLAN TO PROTECT THE PCT AND THE SEMIPRIMITIVE AREA.

(33) THE DRAFT EIS-EIR DID NOT EVALUATE THE SITE SPECIFIC EFFECTS TO RECREATIONALISTS WHO USE THE RIDGETOPS AND SLOPES FOR SKING AND SNOWMOBILING WHERE THE PROPANE DISPENSERS WILL BE LOCATED. THERE IS A POTENTIAL PUBLIC SAFETY PROBLEM BECAUSE SKIERS AND SNOWMOBILE USERS COULD POTENTIALLY BE INJURED SHOULD THEY ACCIDENTLY RUN INTO THESE FACILITIES DURING RECREATIONAL PERIODS IN THE WINTER. ALSO THE DIRECT CONTACT OF PROPANE MIST FROM THE DISPENSERS COULD POTENTIALLY AFFECT THE HEALTH AND WELL BEING OF SKIERS AND SNOWMOBILE USERS. ALSO THERE IS THE POTENTIAL THAT ADDITIONAL SNOWFALL CAUSED BY THE PROJECT COULD INCREMENTALLY CREATE AVALANCHES HAVING ADVERSE EFFECTS TO PUBLIC SAFETY.

THE DRAFT EIS-EIR DID NOT EVALUATE THE EFFECTS TO PUBLIC SAFETY AND PUBLIC HEALTH DURING THE WINTER PERIODS WHEN SKIERS AND SNOWMOBILE USERS ARE USING THE RIDGE TOPS AND SLOPES FOR RECREATIONAL ACTIVITIES. THE EIS-EIR IS DEFICIENT FOR THIS REASON.

d) Maintain the character of the Gold Lake semi-primitive area by employing the Rx-8 Prescription. The Rx-8 requires the maintenance of high visual quality and adequate treatment of damages from catastrophic events. The Rx-6 Prescription also requires the implementation of the Forestwide Standards and Guidelines in the PNF Forest Plan.

CONCLUSION:

(34) AS STATED BEFOREHAND, THE DWR SHOULD BE REQUIRED TO COMPENSATE THE PNF FOR ANY DAMAGES TO PUBLIC PROPERTY FROM DAMAGES CAUSED BY A PROJECT CAUSED WILDLIFE.

Forestwide Standards and Guidelines

The Forestwide Standards and Guidelines in the PNF Forest Plan requires the following:

Visual Resources - "Preservation" - "Allow for ecological changes only. Preclude management activities except for recreation facilities, with low visual impact."

Visual Resources - "Retention" - "Provide a natural-appearing landscape where management activities are not visually evident."

Visual Resources - "Partial Retention" - "Provide a natural-appearing landscape where management activities remain visually subordinate."

Visual Quality Objectives - "Meet V.Q.O.'s by applying techniques described in publications listed in Appendix K."

Visual Quality - "Maximum Modification" - "Employ a V.Q.O. of "Partial Retention" in those areas viewed as foreground from the PCT (Pacific Crest Trail), and allow a V.Q.O. of "Modification" in the middle and background."

Wildlife, Fish and Sensitive Plants - "Trout" - "Improve and protect habitat for trout" - "Ensure that trout habitat quality and quantity are not reduced by streamflow altering activities such as hydroelectric projects."

Wildlife, Fish and Sensitive Plants - "Wild Trout Streams" - "Continue to manage portions of Yellow Creek, Nelson Creek, and the Middle Fork Feather River as Wild Trout Streams. See Management Area Direction for areas [Management] 4, 8, 9, 10, 12, 14, 18, 19, 24, 25, and 33, and Prescription Rx-2."

Riparian Areas - "Favor riparian dependent resources and limit disturbance in all riparian areas including riparian and aquatic ecosystems, wetlands, streambanks, and flood plains." - "Favor riparian resources over other resources, except cultural resources in cases of conflict. Apply Rx-9 Riparian Area Prescription. Also see standards and guidelines for "Water"."

Water - Water Quality - "Maintain or, where necessary, improve water quality using BMP's (10a, 11a) - "Implement FS Best Management Practices to meet water quality objectives and maintain and improve the quality of surface water on the Forest. Identify methods and techniques for applying the BMP's during project planning and incorporate them into the associated project plan and implementation document (See Plan Appendix Q)."

Water - Water Quality - Municipal-Supply Watersheds - "Apply Forest-wide water quality objectives (i.e. State objectives) to municipal-supply watersheds (10a)" - "Through the use of BMP's keep water quality at a level that will allow a safe and satisfactory supply when given reasonable treatment by the purveyor. - "When planning projects within these watersheds, perform hydrologic surveys and analyses, and thereafter monitor for compliance with BMP's."

Water Uses and Needs - "Assure an adequate water supply for PNF and instream needs(10a)." - "Conduct a Water use; Needs, and Availability Survey where stream diversions or flow changes are proposed, except for FERC-regulated projects for which intensive studies are required. Allow new consumptive use only of those waters surplus to current uses, future PNF needs, and needed instream flows. Base conclusions for Class I, II, and III streams on Instream Flow Incremental Methodology (IFIM) or comparable method approved by the Forest Service."

Watershed Protection - "Preserve watershed conditions so that soil productivity conditions and water quality are maintained." - "Protect highly sensitive watersheds thru cumulative impact planning and rehabilitate highly disturbed watersheds." - "Complete the Watershed Improvement Needs Inventory (WIN) and update annually by identifying all lands contributing to watershed degradation thru analysis of NFS watersheds on a priority basis and by individual project assessment. Analysis and mitigation on a total watershed basis, not only on project areas." - "At the project planning level, assess cumulative watershed impacts within 3rd order or smaller watersheds. If the cumulative disturbance is at or near a threshold of causing disproportionate damage, limit additional disturbance by deferring activities and/or by rehabilitation."

Channel Maintenance and Flood Control - "Protect life and property from flooding and stream channel degradation where threat is moderate to high."

Soil - "Prevent significant or permanent impairment of soil productivity." - "During project activities, minimize excessive loss of organic matter and limit soil disturbance according to the Erosion Hazard Rating (EHR)." - "Develop specific soil evaluation and mitigation measures for each project site as needed."

Soil - "Eliminate excessive soil loss" - Develop and apply erosion control plans to road construction, mining, recreation development, and other site disturbance projects. Develop specific mitigation measures for each project site as needed." - "Conduct Order II Soil Surveys by timber compartments to help predict the need for soil protection measures." - "Document observations of slope failure, significant erosion of and from road surfaces, erosion of mine spoils, and any other sources of sediment that are affecting water quality or channel stability. Use for future erosion control planning."

Air Quality - "Adjust activities to prevent violations of air pollutant standards."

Geology - "Protect public safety and Forest resources from slope failure." - Avoid or provide special treatment of unstable areas to avoid triggering mass movement." - Use the PNF Land Stability Risk Classification data for preliminary assessment of instability problems on all projects

which disturb the land surface. Provide geotechnical evaluation of projects with a moderate or higher potential to initiate or accelerate landslides." - "Allow no land disturbing activities on extremely unstable land unless a geotechnical investigation determines certain activities are appropriate. - "Prevent loss of groundwater quality and quantity - Conduct a geotechnical assessment of all ground water development projects or any other project which might adversely impact the groundwater table."

Lands - Special Uses and Corridors - "Allow for land uses by the private sector or other agencies thru permits, if compatible with Management Area Direction, use of other lands is not feasible, environmental impacts are mitigated, and the public interest is protected."

Facilities Other Than Roads - "Comply with requirements of the Federal Water Pollution Control Act, as amended by the Clean Water Act, and all requirements of Federal, State and local agencies governing public water systems and the disposal of wastewater."

Fire and Fuels - "Manage fuels to reduce high risk hazard and/or to facilitate cost-efficient resource protection." - "Clearly define water quality objectives in Burn Plans. Develop, as part of these Plans, mitigation measures to be used where riparian and water quality standards and guidelines cannot be met." - Develop guides for the use of unplanned ignitions, implementation subject to Regional Forester approval."

Law Enforcement - "Protect resources and provide for safety of the public and employees." - "Maintain a Forest Law Enforcement Plan that prescribes actions to eliminate or acceptably reduce law enforcement problems, especially illegal occupancy, timber theft, and incendiary fire." (OUR EMPHASIS)

CONCLUSION

(34) THE DRAFT EIS-EIR IS NOT IN COMPLIANCE WITH MANY OF THE ABOVE STATED FORESTWIDE STANDARDS AND GUIDELINES. THE FINAL EIS-EIR SHOULD COMPLY FULLY TO THESE STANDARDS AND GUIDELINES BEFORE THE PNF APPROVES THIS PROJECT. PLEASE NOTE THE UNLINED ITEMS OF CONCERN.

Deficiencies in Draft EIS-EIR - Under Environmental Issues

A. Long Term Impacts (Page 36)

The draft EIS-EIR fails to have site specific information and data. Without site specific information the conclusion reached in the "Long Term Impacts" section is deficient.

B. Short Term Impacts (Page 37)

The draft EIS-EIR fails to have site specific information and data. Without site specific information the conclusion reached in the "Short Term Impacts" section is deficient.

D. Extra Area Effects (Page 39)

The draft EIS-EIR fails to have site specific information and data. Without site specific information the conclusion reached in the "Extra Area Effects" section is deficient.

E. Air Quality (Page 40)

The draft EIS-EIR fails to have site specific information and data on air quality in the basin. Without site specific information and data the cumulative impacts from site specific and cumulative hydrocarbon sources may adversely affect public health in both Plumas and Sierra Counties. Therefore the conclusion reached in the "Air Quality" section is deficient.

F. Water Resources (Page 42)

The draft EIS-EIR fails to have site specific information and data on rain-snow level, length of winter, snowpack, extent of delayed snowmelt, ground water, avalanches, runoff, floods, water use, and downwind precipitation depletion in the "project area" and "extended project area". Without site specific information and data the cumulative impacts from site specific and cumulative sources may potentially adversely affect rain-snow level, length of winter, snowpack, extent of delayed snowmelt, ground water, avalanches, runoff, floods, water use, and downwind precipitation depletion in the "project area" and "extended project area". Therefore the conclusion reached in the "Air Water Resources" section in the draft EIS-EIR is deficient.

G. Erosion (Page 46)

The draft EIS-EIR fails to have site specific information and data on erosion in the "project area" and "extended project area". Without site specific information and data the cumulative impacts from site specific and cumulative erosion sources may potentially adversely affect water quality and fishery habitat. Therefore the conclusion reached in the "Erosion" section in the draft EIS-EIR is deficient.

G.4. Potential Cumulative Effects (Page 48)

The draft EIS-EIR fails to have site specific information and data on watersheds, water quality, soils, erosion, fish and aquatic life, runoff, floods, ground water, avalanches, water use, endangered and threatened animals, aesthetic values and transportation. Without site specific

information and date the conclusion reached on cumulative effects in the "Potential Cumulative Effects" section in the draft EIS-EIR is grossly deficient.

H. Water Quality (Page 49)

The draft EIS-EIR fails to have site specific information and data on water quality. Without site specific and cumulative information and data the conclusion reached in the "Water Quality" section is grossly deficient.

I. Plant Communities (Page 49)

No comment.

J. Rare Plant (Page 51)

The conclusion reached in the draft EIS-EIR is sufficient in that it was based on site specific project surveys.

K. Wildlife (Page 52)

The draft EIS-EIR fails to have site specific information and data on wildlife species and habitat. Changes in the weather pattern within the "project area" and extended project area" may potentially affect wildlife life stages (all) and habitat. Without site specific information the conclusion reached in the "Wildlife" section is deficient.

L. Fish and Aquatic Life (Page 52)

This section of the draft EIS-EIR is grossly deficient. The DWR relies on workshops conducted on the Medicine Bow Project. Again, both NEPA and CEQA require site specific information and data (studies) for the "project area" and the "extended project area" in the PNF.

Also this section fails to identify the fish species and habitat in specific river and streams within the "project area" and the "extended project area" which may potentially be adversely affected as a result of water quality problems caused by this project by direct, indirect, and cumulative effects.

M. Endangered and Threatened Animals (Pages 52-53)

Simply listing the threatened and endangered species and making generalized comments in the draft EIS-EIR concerning their habitat is not sufficient to identify site specific associated impacts from the project in the "project area" and the extended project area" of the PNF. Changes in the weather pattern within the "project area" and "extended project area" may potentially adversely affect these species life stages (all) and habitat. Without site specific information and data (studies) the conclusion reached

in this section is deficient because of potential modification of their habitat which may jeopardize these species and their habitat.

N. Cultural Resources (Pages 53-54)

No. Comment because site specific surveys were conducted.

O. Aesthetic Values (Page 54)

The location and operation of the propane dispensers may potential adversely affect users of the Pacific Crest Trail and users of the Lake Basin area and the semi-primitive area. This section does not evaluate the site specific potential adverse effects to users and potential adverse effects to visual quality in these areas during the post project operation period. NEPA and CEQA requires site specific information and data (studies).

P. Transportation (Page 55)

This section fails to provide site specific studies which determines the effects and alterations to traffic patterns from this project. Though the CHP and Cal Trans may have conducted studies in the Sierra Nevada, - site specific studies should have been conducted and included in this draft EIS-EIR as evidence which show there will be no effect to traffic patterns and the public who use the roadways in the "project area" and the extended project area". Therefore this section is deficient.

Q. Safety (Page 56)

This section is deficient in many areas. The proposed project will incrementally increase flooding during flooding events. This section fails to have site specific information and data (studies) which determines the potential site specific adverse effects to public safety and property from flooding events both in Plumas County within the "project area" and the "extended project area", and also in the Feather River below Oroville Dam.

R. Fire Hazard (Pages 56-57)

This section does have the necessary mitigation measures to prevent potential fire hazards from occurring from project operations. Also, the draft EIS-EIR did not evaluate the potential adverse effects to dead and drying trees in the PNF from a project caused fire.

S. Regulation and Consistency with Other Planning Documents (Page 57)

The California Health and Safety Code requires the DWR or its agent for this project to file a Hazardous Material Inventory Plan with either Plumas or Sierra Counties, or both, to protect the health and safety of persons, property, or the environment in Plumas and Sierra Counties. This plan was not included in the draft EIS-EIR. The final EIS-EIR should contain a copy of this plan with an explanation showing how the plan will protect public health and safety and the environment.

National Environmental Policy Act (NEPA)

Section 1500.1 (a) of the CFR 40 states as follows in part:

"The National Environmental Policy Act (NEPA) is our basis national charter for protection of the environment. It establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains "action forcing" provisions to make sure that federal agencies act according to the letter and spirit of the Act. The President, the federal agencies, and the courts share responsibilities for enforcing the Act so as to achieve the substantive requirements of section 101."

Section 1500.1 (b) of the CFR 40 states as follows in part:

"NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA."

Section 1502.9 (a) of the CFR 40 states as follows:

"Draft environmental impact statements shall be prepared in accordance with the scope decided upon in the scoping process. The lead agency shall work with the cooperating agencies and shall obtain comments as required in Part 1503 of this chapter. The draft statement must fulfill and satisfy to the fullest extent possible the requirements established for final statements in section 102(2)(C) of the Act. If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion. The agency shall make every effort to disclose and discuss at appropriate points in the draft statement all major points of view on the environmental impacts of the alternative including the proposed action."

Section 1502.9 (b) of the CFR 40 states as follows:

"Final environmental impact statements shall respond to comments as required in PART 1503 of this chapter. The agency shall discuss at appropriate points in the final statement any responsible opposing which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised."

Section 1502.9 (c)(1)(i) of the CFR 40 states as follows:

(c) "Agencies:"

(1) "Shall prepare supplementals to either draft or final statements if:

(i) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts."

Section 1508.7 of the CFR 40 describes cumulative impacts as follows:

"Cumulative Impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal-non-Federal) or person undertakes such other action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Section 1508.8 (a)(b) of the CFR 40 describes effects as follows:

"Effects" include:

(a) "Direct effects which are caused by the action and occur at the same time and place."

(b) "Indirect effects, which are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable. Indirect effects and other effects related to induced population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

"Effects and impacts as used in these regulations [Part 1500 et seq CFR 40] are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial."

CONCLUSION:

It is clearly evident that the draft EIS-EIR failed to analyze the incremental direct, indirect, and cumulative effects to the forest land and water environment from this project, and also from proposed PNF salvage projects, fire salvage projects and green timber sale projects, and past activities. Clearly the draft EIS-EIR is grossly deficient and violates numerous provisions of the Section 1500 et seq of the CFR 40.

California Environmental Quality Act (CEQA)

A draft EIR must identify and focus on the possible significant environmental impacts of a proposed project. (Guidelines, Section 15126, subd. (a) Section 21000, subd. (a)) The greatest emphasis should be placed on those impacts that are most significant and most likely to occur. The analysis should clearly identify both direct and indirect impacts, as they occur both in the short-term and long-term. It should also discuss the environmental specifics of the affected environment; the resources involved; anticipated physical changes and any potential related health and safety problems; anticipated alterations to ecological systems; and probable resulting changes in population distribution and concentration, the human use of the land (including commercial and residential development), and other aspects of the resource base such as water, scenic quality, and public services. (Guidelines, Sections 15126, subd. (a), 15143.)

A Draft EIR must discuss "cumulative impacts" when they are significant. (Guidelines, Section 15130, subd. (a).) These are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. (Guidelines, Section 15355; see also Section 21083, subd. (b).) "[I]ndividually effects may be changes resulting from a single project or a number of separate projects." (Guidelines, Section 15355, subd. (a).) "The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (Guidelines, Section 15355, subd. (b).)

A legally adequate "cumulative impact analysis" thus is an analysis of a particular project viewed over time and in foreseeable probable future projects whose impacts might compound or interrelate with those of the project at hand. Such an analysis "assesses cumulative damage as a whole greater than the sum of its parts." (Environmental Protection Information Center v. Johnson (1985) 170 Cal. App. 3d 604, 625 [216 Cal.Rptr. 502, 515].) Such an analysis is necessary because " '[t]he full environmental impact of a proposed....action cannot be gauged in a vacuum.' " (Whitman v. Board of Supervisors (2d Dist. 1979) 88 Cal. App. 3d 397, 408 [151 443 F. Supp. 866, 872], quoting Akers v. Resor (W.D. Tenn. 1978) 443 F.

Supp. 1355, 1360.) - "[A]n agency may not.....[treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is about one of several substantially similar operations.....To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster." (Whitman, supra, 88 Cal.App.ed at 408 [151 Cal. Rptr. 866, 872], quoting Natural Resources Defense Council v. Callaway (2d Cir. 1975) 524 F.2d 79, 88.)

Unless cumulative impacts are analyzed, agencies tend to commit resources to a course of action before understanding its long term impacts. This, a proper cumulative impacts analysis must be prepared 'before a project gains irreversible momentum.' (City of Antioch v. City Council (1st Dist. 1986) 187 Cal.App.3d 1325, 1333 [232 Cal.Rptr. 507, 511], citing Bozung v. Local Agency Formation Commission (1975) 13 Cal.3d 263, 282 [118 Cal. Rptr. 249, 262].)

One court has described as follows the danger of approving projects without first preparing adequate cumulative impact analyses:

"The purpose of this requirement is obvious: consideration of the effects of a project or projects as if no others existed would encourage the piecemeal approval of several projects that, taken together, could overwhelm the natural environment and disastrously overburden the man-made infrastructure and vital community services. This would effectively defeat CEQA's mandate to review the actual effect of the projects upon the environment." (Las Virgenes Homeowners Federation, Inc. v. County of Los Angeles (2d Dist. 1986 177 Cal 3d. 300, 306 [223 Cal. Rptr. 18, 23].)

Like every aspect of CEQA, "[t]he requirement for a cumulative impact analysis must be interpreted so as to afford the fullest possible protection of the environment within reasonable scope of the statutory and regulatory language." (Citizens to Preserve the Ojai v. Board of Supervisors (1985) 176 Cal. App.3d 421, 431-432 [222 Cal. Rptr. 247, 253], citing Friends of Mammoth v. Board of Supervisors (1972) 8 Cal.3d 247, 259 [104 Cal. Rptr. 761, 771].)

In Citizens to Preserve the Ojai, the courts explained that "It is vitally important that an EIR avoid minimizing the cumulative impacts. Rather, it must reflect a conscientious effort to provide public agencies and the general public with adequate and relevant detailed information about them." [Citations] A cumulative impact analysis which understates information concerning the severity and significance of cumulative impacts impedes meaningful public discussion and skews the decisionmaker's perspective concerning the environmental consequences of a project, the necessity for mitigation measures, and the appropriateness of project approval. [Citation] An inadequate cumulative impact analysis does not demonstrate to an apprehensive citizenry that the governmental decisionmaker has in fact fully analyzed and considered the environmental consequences of its

action." (Citizens to Preserve the Ojai, supra, 176 Cal App.3d at 431 [222 Cal Rptr. 247, 252-253]).

The terms "past, present and reasonably anticipated future projects" include not only projects currently under environmental review." Some projects may be "reasonably foreseeable" even though they may never be built. What matters is whether they appear foreseeable at the time of EIR preparation. (City of Antioch, supra, 187 Cal.App.3d at 1337 [232 Cal.Rptr. 507, 515.]

The California Supreme Court interpreted CEQA for the first time in 1972, in the landmark case Friends of Mammoth v. Board of Supervisors (1972) 8 Cal.3d. 247 [104 Cal. Rptr. 761]. That decision announced that CEQA must be interpreted so "as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language" and that environmental analysis is required not only for projects initiated by government, but also for agency actions, such as the approval or issuance of permits, leases, and other entitlements, taken in response to private initiatives. (8 Cal. 3d at 259, 262 [104 Cal.Rptr. 761, 768, 771].)

CONCLUSION:

It is clearly evident that the draft EIS-EIR failed to analyze the incremental direct, indirect, and cumulative effects to the forest land and water environment from this project and also from proposed PNF salvage projects, fire salvage projects and green timber sale projects, and past activities. Clearly the draft EIS-EIR is grossly deficient and is in violation of the CEQA guidelines requirements.

FINAL CONCLUSION

As clearly shown in this letter of comment, and as stated beforehand, the draft EIS/EIR for the proposed project is grossly deficient as written, is in violation of NEPA, is in violation of CEQA, is not in compliance with the standards and guidelines in the PNF Forest Plan, and conflicts with State Policy regarding the Nelson Creek watershed and the Wild and Scenic Middle Fork Feather River Basin.

Recommendation

This project will provide a net amount of 21,000 acre-feet of water annually for use by out-of-county water contractors using the State Water Project. The catchment basin for this project lies within Plumas and Sierra Counties. This catchment basin acts as a giant reservoir for this project and conveys water to the Oroville Facility of the State Water Project. Plumas and Sierra Counties have "county of origin rights" under the California Water Code and other applicable statutes. This year the DWR purchased 150,000

acre-feet of water from the Yuba County Water Agency (Yuba County) at a rate of \$45.00 per acre foot [6.75 million dollars) for water contractors using State Water Project water.

We recommend the Water Contractors acting through the DWR should fully compensate both Plumas and Sierra counties for water produced by this project. The two counties should be compensated for 21,000 acre-feet of water annually at a rate of \$45.00 per acre foot [\$945,000.00] [Proportional to county areas within the project catchment basin], provided this project is environmentally acceptable, and provided that an adequate Final EIS-EIR is approved for this project which is in compliance with the requirements of the NEPA, the CEQA requirements, and the requirements of the PNF Forest Plan.

Please provide this writer and Mr. Jackson at the address listed below with a copy of the final EIS-EIR and the decision notice by the Forest Supervisor of the PNF.

Thank you for the opportunity to provide comments to you concerning the draft EIS-EIR for this project.

Respectfully Submitted



Robert J. Baiocchi, Executive Director, CSPA
Michael Jackson, Counsel, CSPA & FPW
P.O. Box 357
Quincy, CA 95971

For: CSPA and Friends of Plumas Wilderness

cc: Ms. Mary J. Coulombe, Forest Supervisor
Responsible Federal Official
Plumas National Forest
U.S. Forest Service
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Quincy, CA 95971

Mr. Larry Mullnix, Deputy Director
Responsible State Official
California Department of Water Resources
1416 Ninth Street
Sacramento, CA 95814

Mr. R.C. Bennett, Forest Planner
Responsible Planner and Environmental Officer
Plumas National Forest
U.S. Forest Service

Mr. Robert Hammond, District Ranger, Beckwourth Ranger District
Mr. Charles Smay, District Ranger, La Porte Ranger District
Mr. Jeff Withroe, Milford Ranger District
Mr. Terry Beniot, Water Quality Biologist
Ms. Leslie Mink, Fisheries Biologist
Plumas National Forest

Mr. John Preschutti, Friends of Plumas Wilderness

Mr. Bill Jennings, Chairman of the Board, CSPA

Mr. Jim Crenshaw, President, CSPA

Dr. Tom Sharles, Conservation Chairman, NCCFFF, CSPA Board

Mr. Larry Hampy, President, SWCFFF, CSPA Board

Mr. Jerry Bliss, SWCFFF and CSPA Board

Mr. Gary Widman, Trout Unlimited and CSPA Board

Plumas and Sierra Counties

Interested Parties

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE

EXHIBIT "B"

TO

**DRAFT SUPPLEMENT TO THE ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROTOTYPE PROJECT TO AUGMENT SNOW PACK
BY CLOUD SEEDING USING GROUND BASED DISPENSERS
IN PLUMAS AND SIERRA COUNTIES**

OCTOBER 1, 1991

SUMMARY OF THE PROPOSED RULE TO LIST THE
DELTA SMELT (Hypomesus transpacificus) AS THREATENED

12-MONTH FINDING: In response to a petition requesting the Fish and Wildlife Service (Service) to list the delta smelt as endangered with critical habitat, the Service found that the request was warranted for listing this species as threatened with critical habitat.

PROPOSED RULE SUMMARY:

The delta smelt is a small slender-bodied fish, nearly translucent with a steely-blue sheen to its sides, with a small mouth and relatively large eyes. It lives in the water column of the estuary and subsists on zooplankton.

The species is endemic to Suisun Bay upstream of San Francisco Bay and throughout the Sacramento-San Joaquin River estuary (the Delta). These areas are bordered by and include the eastern portions of Contra Costa, southern portions of Sacramento, western portions of San Joaquin, and southern portions of Solano Counties, California.

The only known population was estimated at about 280,000 individuals, a low population size for a species which lives only a year.

SUMMARY OF FIVE FACTORS AFFECTING THE SPECIES:

A. Delta smelt have experienced a significant population decline of about 90 percent during the past 10 years, no apparent recovery is occurring, and the factors that degraded its habitat continue to occur. Prolonged drought, freshwater exports, and shifted geographic location of the mixing zone have curtailed its habitat and range.

B. No overutilization for commercial, recreational, scientific, or educational purposes is known.

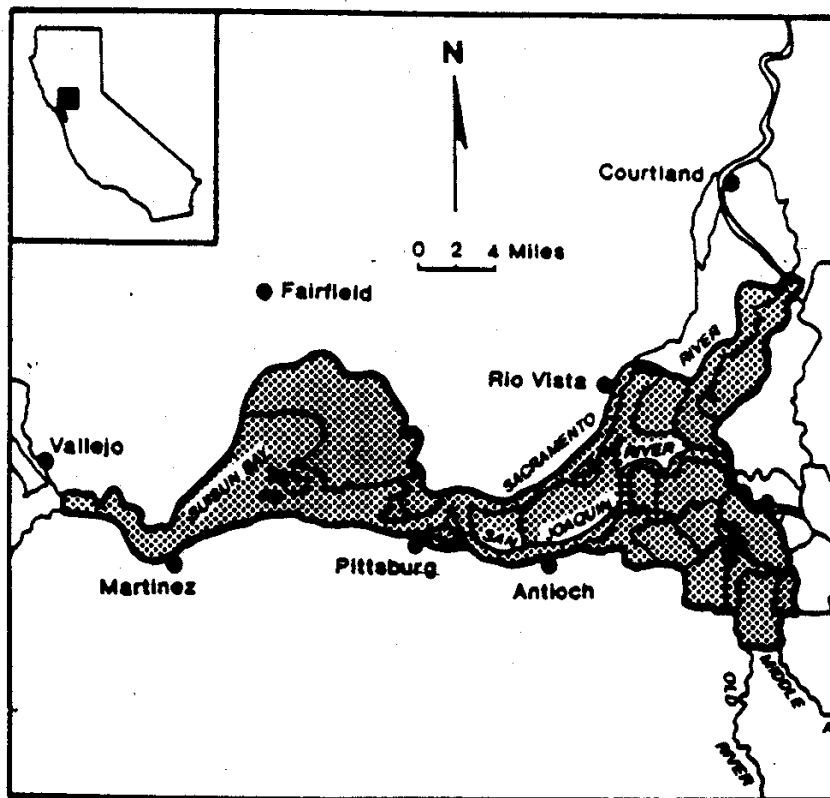
C. Disease and predation are not known to be factors that threaten the delta smelt. However, predation by game and nongame fish in the vicinity of water export projects may be significant.

D. Existing regulatory mechanisms do not currently provide adequate protection for the delta smelt.

E. Other natural or manmade factors such as a limited gene pool because of the present small population size, poor water quality because of agricultural and industrial chemical run-off, and introduced non-native species competing for or affecting the delta smelt food web are contributing to the mortality of delta smelt and the loss and degradation of habitat.

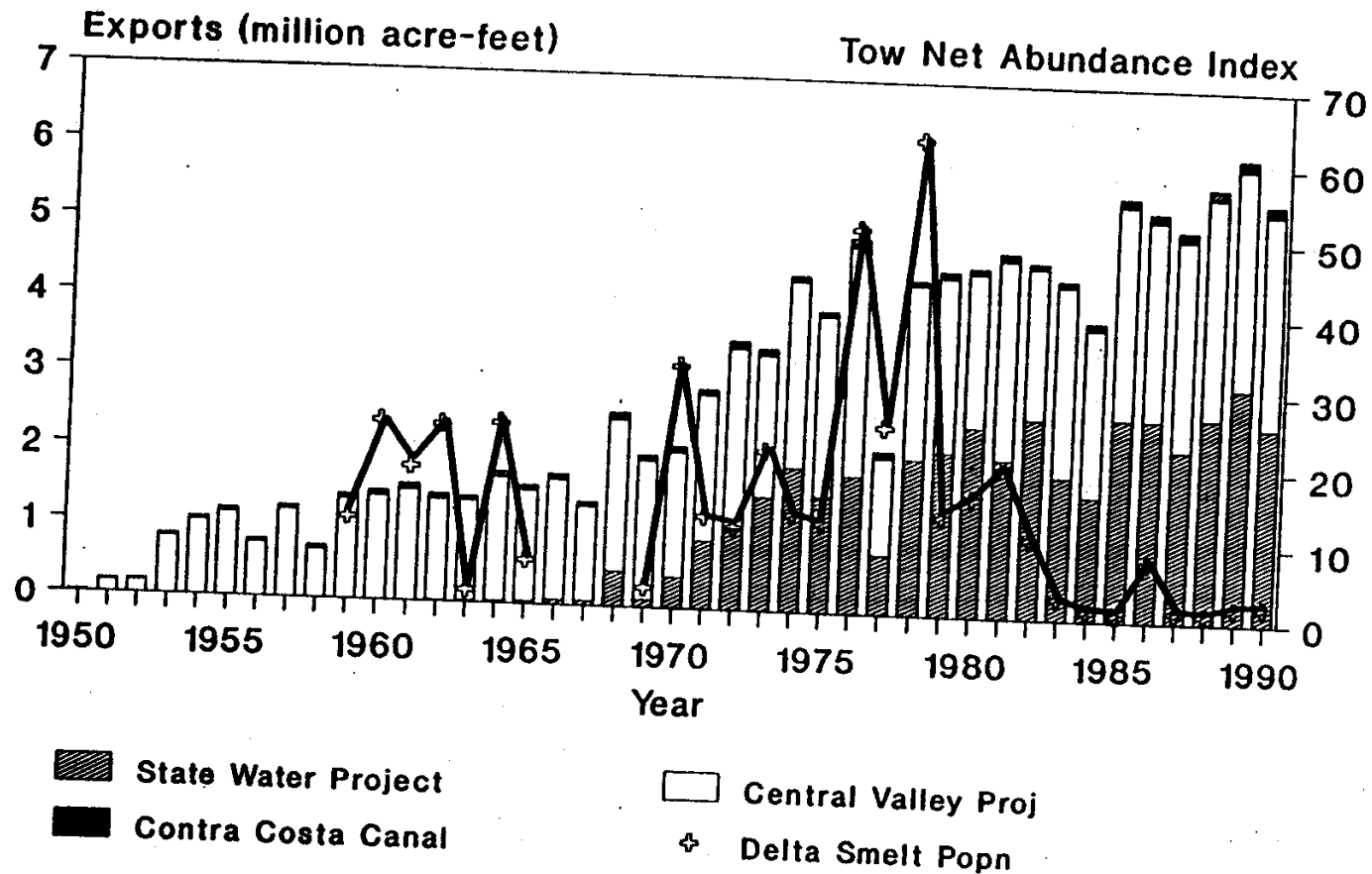
CRITICAL HABITAT:

The Service found that designation of critical habitat was prudent and determinable because delta smelt populations since 1983 have been less than 13 percent of population levels during 1958-1983, and the population is restricted to Suisun Bay and the Delta. Critical habitat proposed for the delta smelt includes all submerged lands below ordinary high water and the entire water column contained in Suisun Bay, the length of Montezuma Slough, portions of the Sacramento River, portions of the Delta, portions of the San Joaquin River, and the contiguous water bodies in between in their entirety. During the comment period on the proposed rule, the Service will seek additional agency and public input on critical habitat, along with information on the biological status of, and threats to the delta smelt.



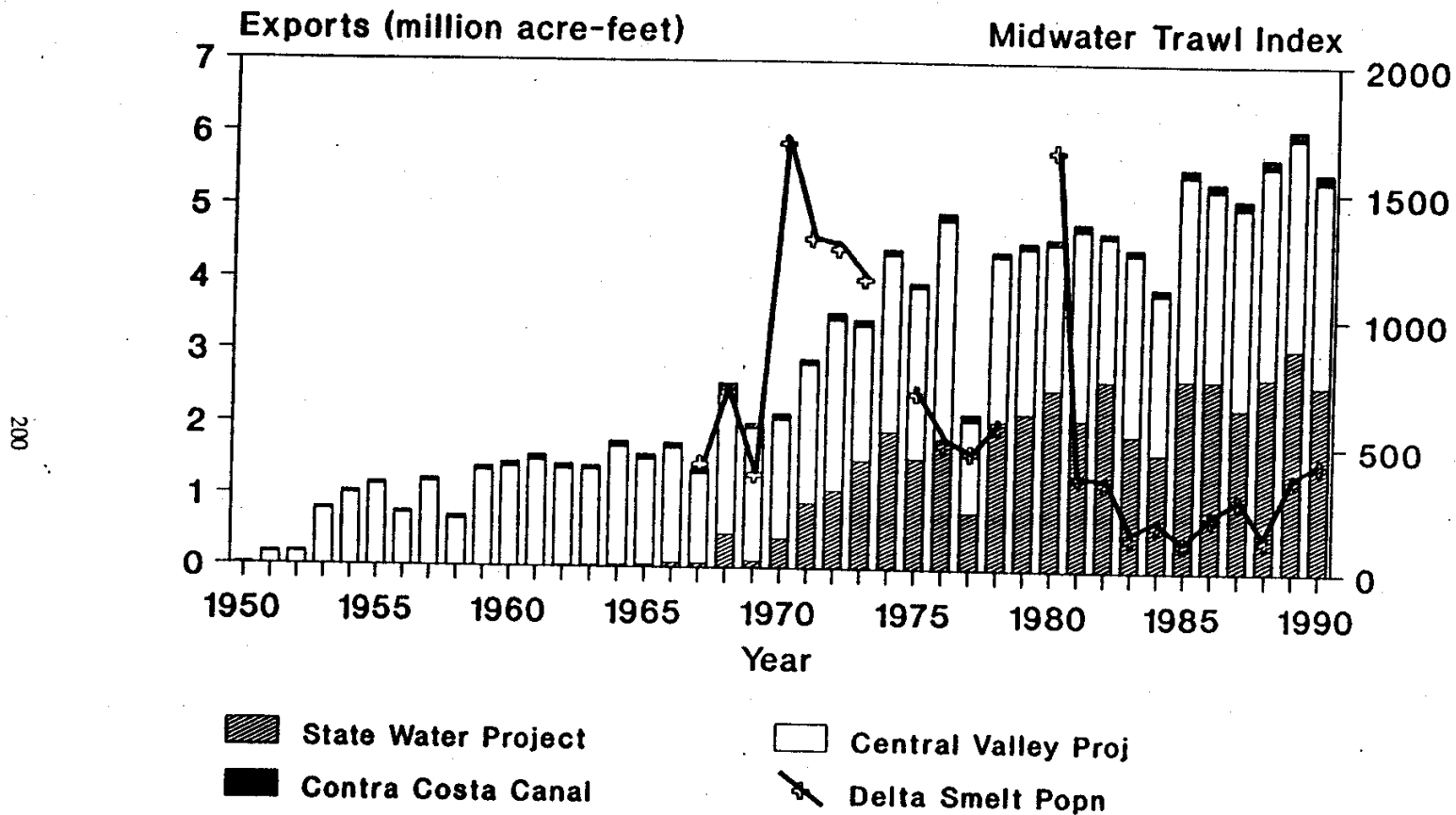
Delta Exports & Smelt Populations

199



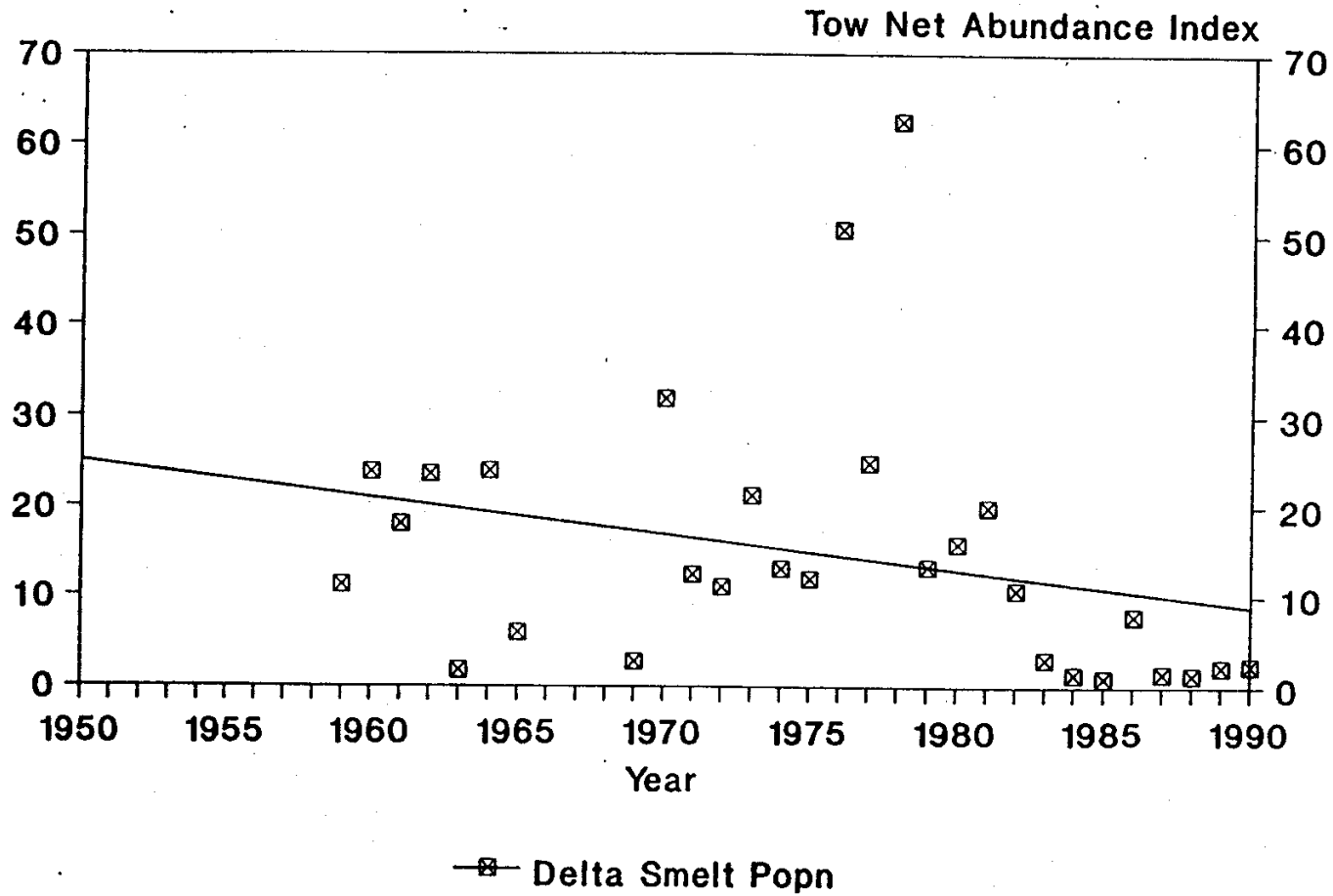
Source: Water Export Data, US Bureau of Reclamation, 1991. Delta Smelt Abundance Index, Calif Dept Fish & Game 1990

Delta Exports & Smelt Populations



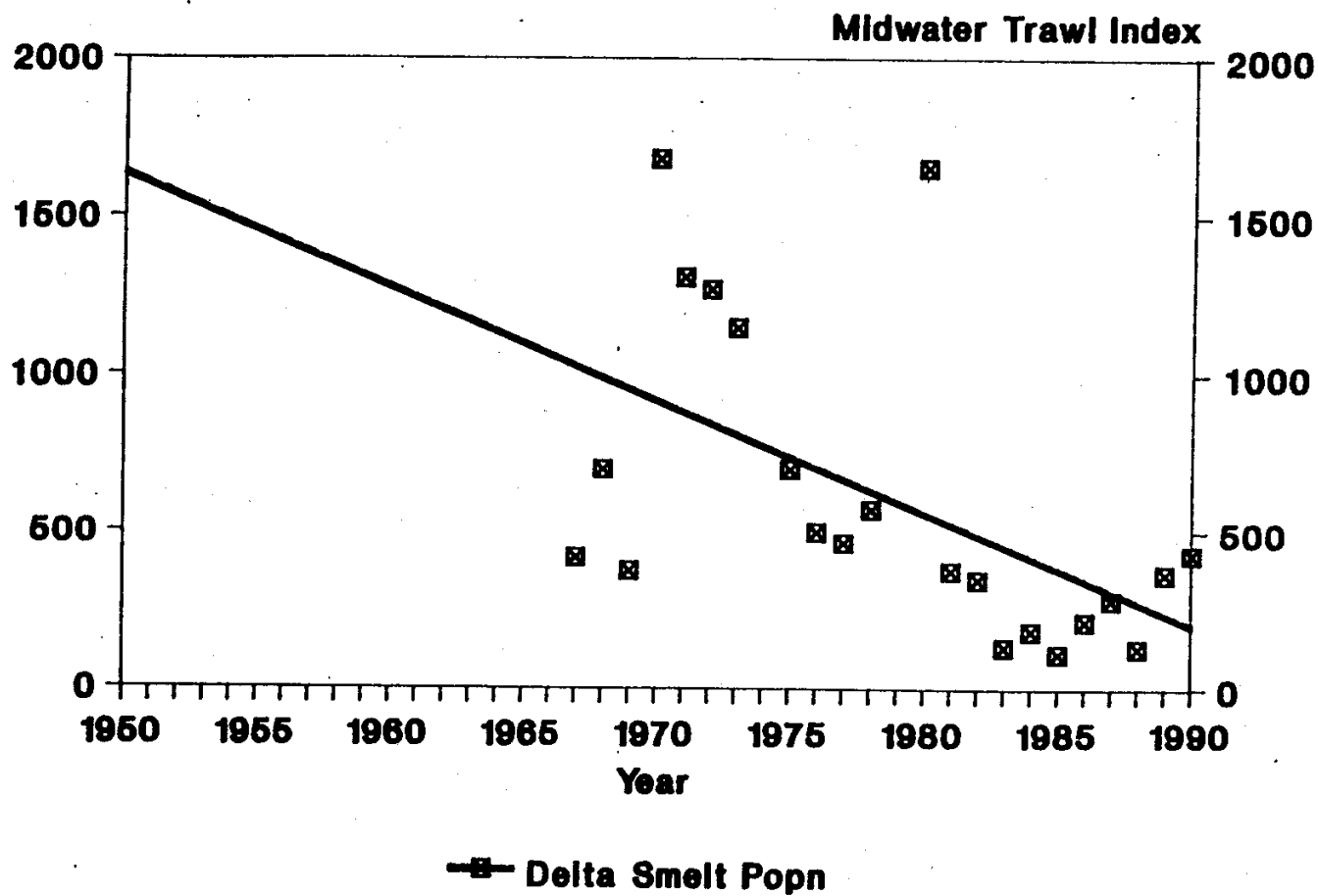
Source: Water Export Data, US Bureau of Reclamation, 1991. Delta Smelt Abundance Index, Calif Dept Fish & Game 1990

Delta Smelt Population Trend



Source: Calif Dept Fish & Game, 1990.

Delta Smelt Population Trend



Source: Calif Dept Fish & Game, 1990.

NEWS RELEASE

U. S. FISH & WILDLIFE SERVICE - REGION 1

911 N.E. 11th AVENUE
PORTLAND, OREGON 97232-4181

IDAHO - NEVADA - CALIFORNIA - WASHINGTON - OREGON -
HAWAII AND THE PACIFIC ISLANDS

C-G

91-38

Refer: Cynthia U. Barry 916/978-4866 (Sacramento, CA)
503/231-6121 (Portland, OR)

For Release: September 27, 1991

FISH AND WILDLIFE SERVICE PROPOSES THREATENED STATUS. WITH CRITICAL HABITAT. FOR DELTA SMELT

The Interior Department's U.S. Fish and Wildlife Service today proposed designation of the delta smelt, a small fish of the Upper Sacramento-San Joaquin Delta in northern California, as a threatened species. Today's action begins a one-year review period during which public comment about the proposed listing will be sought before a final decision is made.

The delta smelt, a species requiring a mixture of fresh and salt water in which to live and reproduce, is threatened primarily by loss of its habitat. Contributing to this decline are the diversion of freshwater from river systems supplying water to areas where it lives; California's recent prolonged drought; the presence of non-native aquatic species which disrupt the smelt's food chain; and water quality deterioration which can harm young fish.

In making today's announcement, Fish and Wildlife Service Pacific Regional Director Marvin Plenert said a technical work group, consisting of Service and outside biologists, is being assembled to review all available scientific information concerning the delta smelt and its habitat.

"Before any final decision is made on this proposal, we will compile and review the best information available regarding the status of the delta smelt population and the highly complex hydrology of the Delta," Plenert said. "In the meantime, our close working relationships with the Bureau of Reclamation in California and the California Department of Water Resources to conserve the delta smelt will continue and will be directed at mitigating any further impacts to the smelt."

"We recognize the state-wide interest in this proposed listing," Service Director John Turner said, "and we will work very closely with all interested parties in California to determine and bring about the best and most balanced measures to meet the needs of this species."

(over)

Today's proposed rule includes a proposed critical habitat designation for the delta smelt that considers all water and submerged lands below the high tide mark in Suisun Bay, the length of Montezuma Slough, portions of the Sacramento and San Joaquin Rivers, and portions of the Delta and adjacent waters.

Critical habitat is defined by the Endangered Species Act as those areas containing the physical and biological features essential to the conservation of a species. Critical habitat often has been widely misunderstood as equivalent to setting aside a sanctuary for a species. The Endangered Species Act requires that, after a final listing, Federal agencies consult with the Fish and Wildlife Service when actions they might take could affect an endangered species, or adversely modify its critical habitat. In cases where actions would harm a species, the Act requires the Service to work with the involved agency to develop "reasonable and prudent" alternatives. In practice, this often means proposed projects can be carried out if modified to avoid jeopardy to the species.

The delta smelt is a small fish, rarely more than 3 inches long, with a nearly translucent body and a steely-blue sheen on its sides. It is the only smelt native to California and the only native species that spends its entire life in the Sacramento-San Joaquin Delta.

Historically occurring from Suisun Bay and upstream to the towns of Isleton on the Sacramento River and Mossdale on the San Joaquin River, delta smelt are now found primarily in the Sacramento River channel of the Delta. The species is now considered rare in Suisun Bay and virtually absent from Suisun Marsh where they once were seasonally common. Population estimates provided from the California Department of Fish and Game and the University of California at Davis indicate the species has declined by almost 90 percent over the last 20 years, from 2.6 million fish to about 280,000. Although the current population has remained stable over the past 5 years, it has done so at very low levels, and with little apparent recovery occurring. The California Fish and Game Commission, in view of this evidence, has requested further studies.

The Endangered Species Act provides for a 6-month extension of the one-year review period if there is evidence of scientific disagreement.

The delta smelt has adapted to living in the seawater-freshwater mixing zone of brackish and freshwater areas where it depends entirely on zooplankton for food. It lives only one year and spawns in freshwater between February and June. Its eggs and larvae require freshwater at low salinity levels to survive during this time. As a result, they are vulnerable to changing water conditions.

The annual export of approximately 6 million acre-feet of fresh water away from the estuary by Federal and state projects, with an additional 2 to 3 million acre-feet of water diverted by private Delta water users, has allowed the intrusion of higher salinity seawater into Delta marshes. This has restricted the delta smelt's spawning and larval nursery areas to less favorable river channel habitat. Additionally, the rates at which water is exported from

(more)

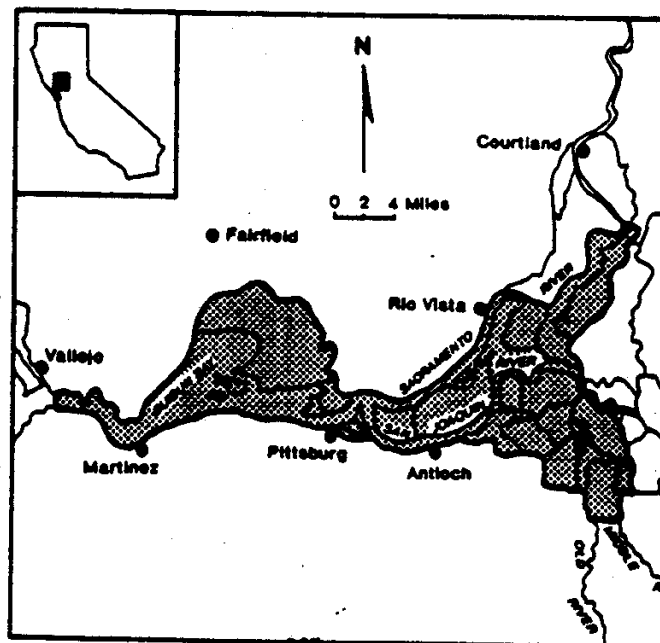
the Delta by the Central Valley Project and the State Water Project pumping stations cause some Delta channel waters to reverse and flow upstream, which can seriously disrupt fish migrations and cause larval and juvenile fish to die.

The Service identified the delta smelt as a likely candidate for proposed listing in 1989, when the fish was listed as a "category 1" candidate species. This designation is used for advanced warnings on species for which the Service has substantial information to support a listing proposal, although other listing actions preclude listing action on the candidate. Generally, category 1 candidate species are likely to be officially proposed for listing as endangered or threatened, and should be considered in environmental planning.

Under the Endangered Species Act, an "endangered" species is one in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one likely to become endangered within the foreseeable future.

On June 29, 1990, the Service received a petition from the California-Nevada Chapter of the American Fisheries Society to list the delta smelt as endangered, with critical habitat. In December 1990, the Service determined that substantial information had been presented and that listing may be warranted. A status review was initiated at that time.

A complete description of the Service's proposal will be published soon in the Federal Register. Public comments about the proposal will be taken for 120 days thereafter and should be sent to: Field Supervisor, Sacramento Field Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Room E-1803, Sacramento, California 95825-1846. Copies of the proposal are available from the Sacramento Field Office. Information on public hearings, to be held in Sacramento and other locations during the public comment period will be announced at a later date.



Area of proposed critical habitat
for the delta smelt

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE

EXHIBIT "C"

TO

**DRAFT SUPPLEMENT TO THE ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROTOTYPE PROJECT TO AUGMENT SNOW PACK
BY CLOUD SEEDING USING GROUND BASED DISPENSERS
IN PLUMAS AND SIERRA COUNTIES**

OCTOBER 1, 1991

DEPARTMENT OF WATER RESOURCES

1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 445-9248



February 22, 1991

BY CERTIFIED MAIL

John S. McMorrow
Planning Director
Plumas County
P.O. Box 10437
Quincy, CA 95971-6013

Dear Mr. McMorrow:

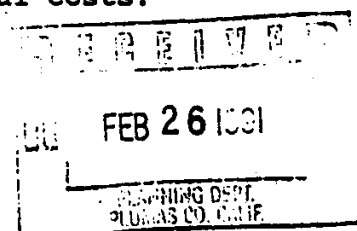
Your letter of December 3, 1990 has been referred to me by Gerald Boles of our Department. Thank you for your patience in awaiting our response. I apologize for the delay.

The State's immunity from local land use regulation is well established. Hall v. City of Taft, 47 Cal. 2d 177, 302 P.2d 574 (1956); 71 Ops. Cal. Atty. Gen. 332 (1988); City of Santa Cruz v. Board of Education, 210 Cal. App. 3d 1, 258 Cal. Rptr. 101 (1989). Accordingly, under this legal principle of state sovereignty, the Department's weather modification program is not subject to Plumas County's Special Use Permit requirements.

The Department, however, regrets the confusion that seems to have occurred over this issue and desires to promote improved relations with Plumas County for the future. We would like to resume discussions with the County in an effort to reconcile some of the remaining issues with regard to the Department's weather modification program.

Specifically, Gerald Boles has informed me that the County seeks reimbursement for certain costs attributable to our project. Pursuant to the Department's obligations under the California Environmental Quality Act and other statutory authority, and assuming that the County can provide the appropriate documentation of such costs, we are prepared to discuss the County's additional costs arising from implementation of the Department's project.


To the degree that the Department has responsibilities, under CEQA and other laws, to mitigate for the impacts of our project, we would like to discuss with you possible ways for designing mitigation measures to reduce the County's additional costs.



John S. McMorrow
February 22, 1991
Page 2

Gerald Boles will be contacting you to set up a meeting. If you have any questions, please call Gerald at (916) 527-6530, or myself at (916) 445-4857.

Sincerely,


Linda Ackley
Staff Counsel

cc: Gerald Boles

TIMBER MINING

PZ

Article 32. Timberland Production Zone (TPZ)

Sec. 9-2.3201. Purpose (TPZ).

The purpose of this article is to provide a zoning strict consistent with the mandates of the Berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976 encouraging the protection of immature trees and restricting the use of upland to the production of timber products and compatible uses. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3202. Uses (TPZ).

The following uses shall be permitted in the Timberland Production Zone (TPZ):

(a) The growing and harvesting of timber, including Christmas trees, and measures to protect such timber;

(b) The following uses, except in specific instances where such use would significantly detract from the use of property for the uses set forth in subsection (a) of this section:

(1) Management for watershed;

(2) Management for fish and wildlife habitat and hunting and fishing;

(3) Uses integral to the uses set forth in subsection (a) of this section, including forest management roads, log landings, log storage areas, and temporary portable wood processing equipment;

(4) Management for the use of other natural resources where less than three (3) acres of land is converted to non-timberland use and hydroelectric generation subject to site development review as set forth in Article 11.3 of this chapter;

(5) Grazing;

(6) Public utility facilities as permitted by Section 2.415 of Article 4 of this chapter;

(7) A residence or other structure necessary for the management of a parcel zoned as timberland production if such parcel is 10 acres or greater in size; child day care homes; and limited child day care homes; and

(8) Where a single parcel is partially zoned as timberland production and agricultural, structures necessary for the management of agricultural land may be located within the timberland production area; and

(c) Subject to the issuance of a special use permit:

(1) Public service facilities. (§ 3, Ord. 84-593, eff. January 3, 1985, as amended by § 25, Ord. 86-623, eff. February 6, 1986)

Sec. 9-2.3203. Qualifications for inclusion (TPZ).

Lands meeting one of the following criteria shall be zoned Timberland Production Zone (TPZ):

(a) Parcels shown on Lists A or B and which are found to meet the specifications of the Berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976; or

(b) Parcels petitioned for inclusion which satisfy all of the following criteria:

(1) A map has been prepared showing the legal description or the Assessor's parcel number of the property desired to be zoned;

(2) A forest management plan has been prepared or approved by a registered professional forester providing for timber harvest within a reasonable period of time;

(3) Timber stocking standards of the Forest Practices Act and the Forest Practice Rules of the State Board of Forestry are met or will be met within five (5) years as secured by agreement;

(4) The area is in one ownership of at least forty (40) acres.

(5) The average timber site is III or higher according to the site rating system of the State Board of Forestry; and

(6) The currently existing uses on the parcel are permitted uses as set forth in Section 9-2.3202 of this article. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3204. Area (TPZ).

Parcels zoned as Timberland Production Zone (TPZ) shall not be divisible into parcels containing less than forty (40) acres, unless:

(a) Four-fifths (4/5) of the members of the Board find that a proposed division is in the public interest; and

(b) The original owner prepares a joint timber management plan prepared or approved as to content by a registered professional forester for the parcels to be created. The joint timber management plan shall provide for the management and harvesting of timber by the original owner and any subsequent owners, and shall be recorded with the County Recorder as a deed restriction on all newly-created parcels and shall be subject to all the other provisions of the Forest Taxation Reform Act of 1976, in addition to the normal requirements of this chapter. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3205. Rezoning (TPZ).

Any rezoning of land from Timberland Production Zone (TPZ) to another zoning district classification shall be in conformance with the requirements of the Forest Taxation Reform Act of 1976, in addition to the normal requirements of this chapter. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3206. Height and yards (TPZ).

The provisions of the General Forest Zone (GF) set forth in Article 33 of this chapter shall apply in the Timberland Production Zone (TPZ). (§ 3, Ord. 84-593, eff. January 3, 1985)

Article 33. General Forest Zone (GF)

Sec. 9-2.3301. Purpose (GF).

The purpose of the General Forest Zone (GF) is to protect and preserve for present and future utilization commercially viable important timber resource production areas not in the Timberland Production Zone (TPZ). (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3302. Uses (GF).

(a) The following uses shall be permitted in the General Forest Zone (GF):

(1) Timber management, agriculture, wildlife management, and animal breeding and boarding;

(2) One dwelling unit and one additional dwelling unit on any parcel of eighty (80) acres or more; and

(3) Child day care homes, limited child day care homes, and home businesses.

(b) The following uses shall be permitted subject to the issuance of a special use permit:

(1) Mining, limited electric generation, home industry, public utility facilities, public service facilities, outdoor shooting ranges, and hunting clubs.

(c) The following uses shall be permitted subject to the issuance of a planned development permit:

(1) Dwelling units at the ratio of up to one per each forty (40) acres of lot area. (§ 3, Ord. 84-593, eff. January 3, 1985, as amended by § 26, Ord. 86-623, eff. February 6, 1986)

Sec. 9-2.3303. Height (GF).

No structure in the General Forest (GF) shall exceed sixty (60') feet in height, except for dwelling units, which shall not exceed thirty-five (35') feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3304. Area and width (GF).

(a) The minimum gross lot area in the General Forest Zone (GF) shall be (40) acres.

(b) The minimum width shall be 300 feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3305. Yards (GF).

The minimum yard requirements in the General Forest Zone (GF) shall be as follows:

(a) Front yards: not less than twenty (20') feet; and

(b) Side and rear yards: not less than five (5') feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3306. Parking and loading (GF).

Parking and loading in the General Forest Zone (GF) shall be as required by Section 9-2.414 of Article 4 of this chapter (General Requirements: Parking and loading). (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.3307. Signs (GF).

(a) Signs in the General Forest Zone (GF) shall be as permitted by Section 9-2.416 of Article 4 of this chapter (General Requirements: Signs).

(b) Business signs shall not exceed thirty-two (32) square feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Article 14. Mining Zone (M)

Sec. 9-2.1401. Purpose (M).

The purpose of the Mining Zone (M) is to provide for the utilization of commercially viable prime mining resources and to permit no use which will preclude the extraction of materials. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.1402. Uses (M).

(a) The following uses shall be permitted in the Mining Zone (M):
(1) Mining, agriculture, timber management, hydroelectric generation, water impoundment, public utility facilities, animal breeding and boarding, and limited electric generation;

(2) One dwelling unit; and

(3) Child day care homes and limited child day care homes.

(b) The following uses shall be permitted subject to site development review as set forth in Article 11.3 of this chapter:

(1) Hydroelectric generation.

(c) The following uses shall be permitted subject to the issuance of a special use permit:

(1) Recreation facilities and public service facilities. (§ 3, Ord. 84-593, eff. January 3, 1985, as amended by § 27, Ord. 86-623, eff. February 6, 1986)

Sec. 9-2.1403. Height (M).

No structure in the Mining Zone (M) shall exceed 100 feet in height, except for dwelling units, which shall not exceed thirty-five (35') feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.1404. Area and width (M).

(a) The minimum gross lot area in the Mining Zone (M) shall be ten (10) acres.

(b) The minimum width shall be 300 feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

Sec. 9-2.1405. Yards (M).

The minimum yard requirements in the Mining Zone (M) shall be as follows:

(a) Front yards: twenty (20') feet; and

(b) Side and rear yards: five (5') feet. (§ 3, Ord. 84-593, eff. January 3, 1985)

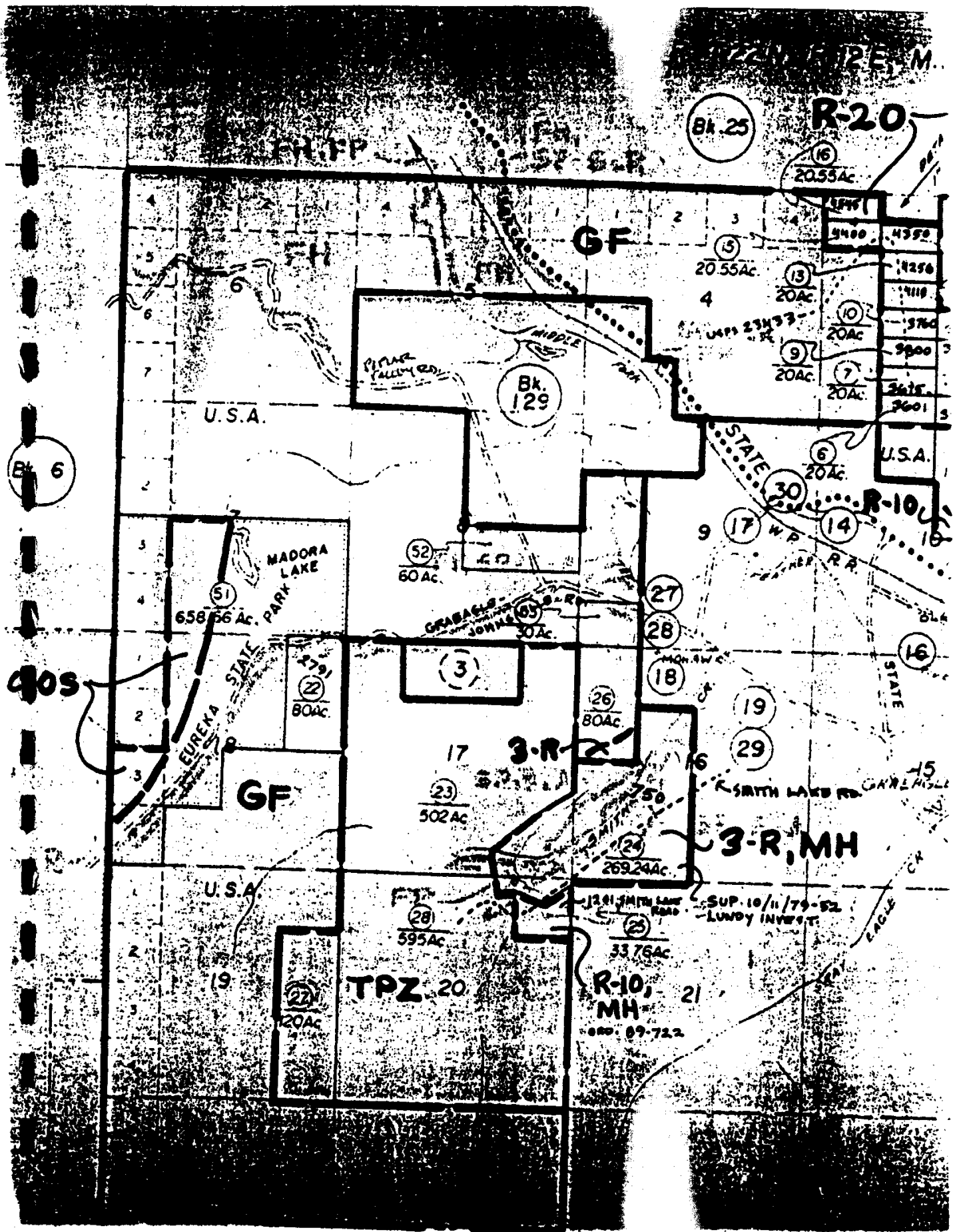
Sec. 9-2.1406. Parking and loading (M).

Parking and loading in the Mining Zone (M) shall be as required by Section 9-2.414 of Article 4 of this chapter (General Requirements: Parking and loading). (§ 3, Ord. 84-593, eff. January 3, 1985)

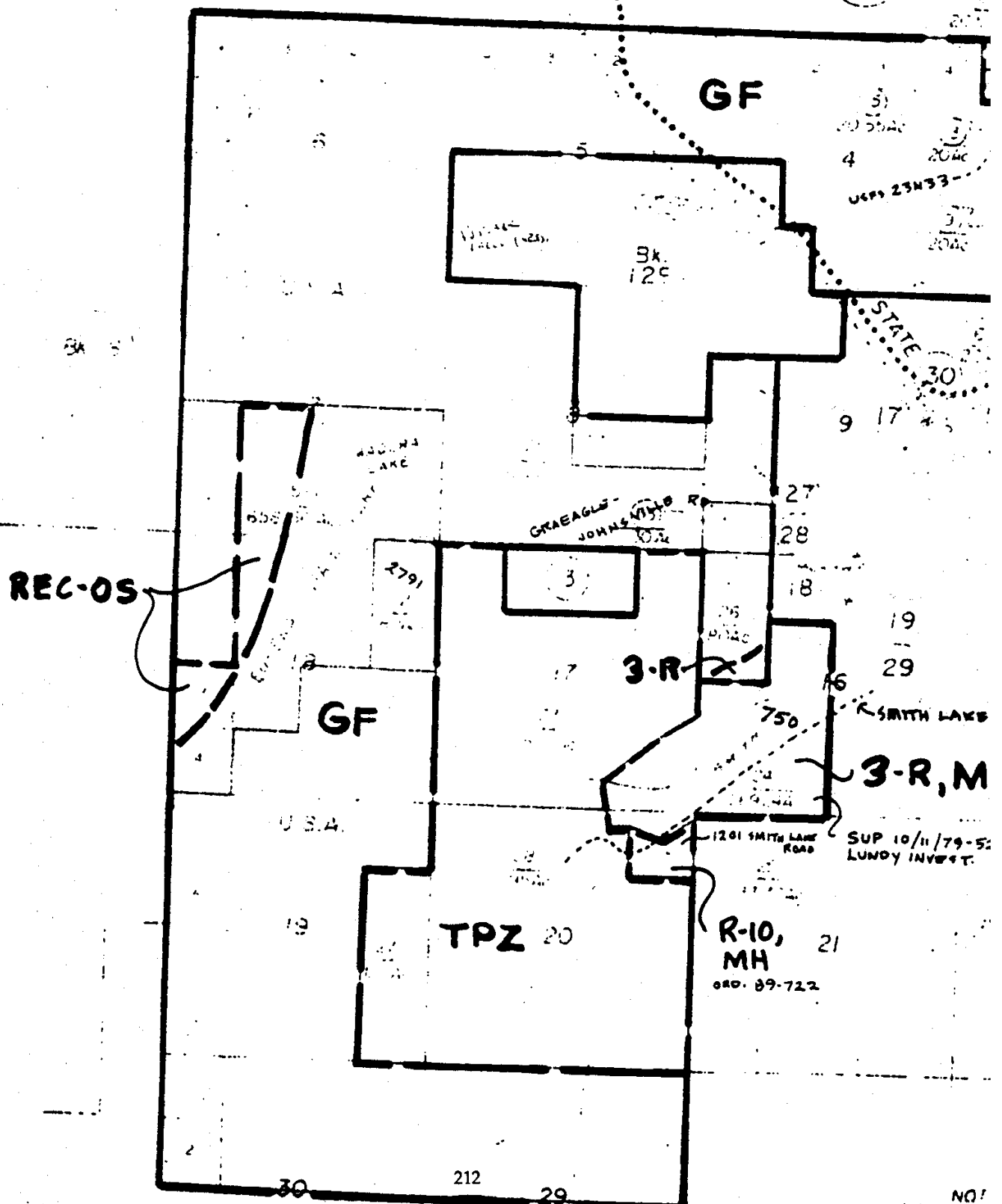
Sec. 9-2.1407. Signs (M).

(a) Signs in the Mining Zone (M) shall be as permitted by Section 92.416 of Article 4 of this chapter (General Requirements: signs).

(b) Business signs shall not exceed thirty-two (32) square feet. (§ 3, Ord. 84-593, eff. January 3, 1985)



Bk. 25

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California Sportfishing Protection Alliance

Mr. Gerald Boles, Project Manager
Northern District
Department of Water Resources
P.O. Box 607
Red Bluff, CA 96080

June 4, 1991

Re: Weather Modification Propane Tank Storage Area.

Yesterday I received a telephone call and spoke to residents in the Johnsville area concerning the placement of propane tanks on Soper-Wheeler property. I spoke to Ms. Lynn Douglas and Mr. Dave King. Also, yesterday I spoke to you and you indicated the propane tanks were being stored there by your agency and were associated with the proposed cloud seeding test project which is under appeal by the CSPA with the U.S. Forest Service.

I was told by the residents that the propane tanks were airlifted on the Soper-Wheeler property by helicopters, and that there were a significant number of propane tanks placed on the property. Mr. King told me that the area was logged sometime ago and was extremely dry with bunches of dry material scattered adjacent to the propane tanks storage areas. I was also told that propane tanker trucks filled the tanks with propane after they were airlifted on the property. Mr. King also told me that he was also concerned about the possibility of an accident occurring when helicopters airlifting the propane tanks flew over his property. His property is adjacent to the Wheeler property.

After consulting with you, I met with Mr. Steve Millay of the Plumas County Planning Department. Based on the information I provided him, and a map provided to me by Mr. Millay, we found the Soper-Wheeler property where the tanks are stored is zoned a "Timberland Production Zone". The section number on the map is No. 17. I obtained a description of the location of the Soper-Wheeler property and the location of the propane tanks storage area from Mr. King.

Please be advised that the storage of propane tanks on the Soper-Wheeler property is prohibited by the Plumas County Zoning requirements. Please see Article 32 of the attached TPZ requirements.

We are requesting your agency to comply fully with the county zoning requirements and remove the propane tanks to another location immediately.

Please consult with Mr. Steve Millay and County Supervisor John Schramel of Plumas County for information on the zoning requirements.

In the event your agency decides to store the propane tanks on private property in Plumas County, we are requesting your agency to obtain a conditioned permit which complies fully to all applicable statutes and county requirements. Naturally the permit should be obtained from Plumas County before storage commences. Also an environmental document, pursuant to the CEQA Guidelines, should be prepared by your agency and approved by Plumas County before the permit is approved.

In the event your agency decides to ignore the county zoning requirements and decides to store the propane tanks at the present location, we recommend and urge the county to take legal actions against your agency.

If there are any further questions, please contact Mr. Michael Jackson, Counsel, CSPA, at 916-283-1007. I can be reached at my office at 916-283-3767.

A written response is being requested. Thank you.

Respectfully Submitted

A handwritten signature in cursive script, reading "Bob Baiocchi", written in black ink.

Robert J. Baiocchi, Executive Director, CSPA
P.O. Box 357
Quincy, CA 95971
Tel: 916-283-3767

cc: Mr. John Schramel, Supervisor
Plumas County

Ms. Joyce Scroggs, Supervisor
Plumas County

Mr. Steve Millay, Planner
Plumas County Planning Department

Mr. Mike Jamison, Counsel
Plumas County

Mr. Michael Jackson, Counsel, CSPA

Interested Parties

Attachments

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